

## **Appendix G US Fish and Wildlife Service Biological Opinion**



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office  
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Sacramento, California 95825-1846



In Reply Refer To:  
1-1-05-F-0300

OCT 18 2006

Mr. Gene Fong  
Federal Highway Administration  
Department of Transportation  
650 Capital Mall, Suite 4-100  
Sacramento, California 95814

Subject: Formal Consultation on three Highway 101 Lane Widening and Improvement Projects in Sonoma County, California: the Old Redwood Highway in Petaluma to Rohnert Park Expressway in Rohnert Park Project, the Wilfred Avenue Interchange Project, and the Steele Lane in Santa Rosa to Windsor River Road Project

Dear Mr. Fong:

This is in response to your October 25, 2004, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Highway 101 Lane Widening and Improvement Projects (three Highway 101 projects identified as the Northern Project, the Wilfred Project, and the Central Project) located between Petaluma and Windsor, Sonoma County, California. Your request for formal consultation was received in our office on October 26, 2004.

This document represents the Service's biological opinion on the effects of the action on three endangered plant species (the three listed plants): Sebastopol meadowfoam (*Limnanthes vinculans*), Sonoma sunshine (*Blennosperma bakeri*), and Burke's goldfield (*Lasthenia burkei*); and the endangered Sonoma County Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*). This biological opinion is issued pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). Critical habitat has not been designated for the California tiger salamander or the three listed plants in Sonoma County therefore none will be destroyed or adversely modified by the proposed three Highway 101 projects.

The proposed three Highway 101 projects are not likely to adversely affect the threatened California red-legged frog (*Rana aurora draytonii*) due to an apparent lack of occupied or potential habitat for this listed species in the action area. Critical habitat has been designated for the California red-legged frog, however none is located in the action area for the three Highway 101 projects.

This biological opinion is based on information provided in the following:

1. The October 25, 2004, letter from the Federal Highway Administration (FHWA) requesting formal consultation for the three Highway 101 projects;
2. The March 2004 Biological Assessment for the Wilfred segment of the three Highway 101 projects prepared by the California Department of Transportation (Caltrans);
3. The revised June 2004 Biological Assessment for the Wilfred segment of the three Highway 101 projects prepared by Caltrans;
4. The August 2004 California tiger salamander Biological Assessment for the three Highway 101 projects, prepared by Parsons;
5. The revised October 2004 California tiger salamander Biological Assessment for the three Highway 101 projects, prepared by Parsons;
6. Meetings between the Service, the applicants (Caltrans and Sonoma County Transportation Authority [SCTA]) and SCTA representatives (Parsons and Michael Fawcett);
7. E-mail correspondence between Ryan Olah, Cheryl Hickam, Joni Mitchell, Vincent Griego, and John Cleckler of my staff and the applicants representatives;
8. Field investigations by Chris Nagano, Vincent Greigo, and John Cleckler of my staff;
9. Geographic Information System (GIS) information provided to the Service by Caltrans;
10. The June 29, 2005, letter from the Service to Jeffrey C. Kolin, Santa Rosa City Manager describing the interim mitigation guidelines identified by the Santa Rosa Conservation Strategy (Conservation Strategy) team;
11. *The Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects that May Affect Four Endangered Plant Species on the Santa Rosa Plain, California* (File Number 22342N);
12. The March 14, 2006, meeting between the Service and FHWA, Caltrans, SCTA, Sonoma County, and Parsons.

13. The June 1, 2006, site visit between the Service and Caltrans and SCTA to discuss the exclusion of specific locations within the proposed project area from potential California tiger salamander habitat.
14. Comments from the California Department of Fish and Game regarding their review of the draft biological opinion.
15. References cited in this biological opinion; and
16. Other information available to the Service.

### CONSULTATION HISTORY

November 17, 2001: David Wooten of the Service met with Geoff Monk (consultant to Caltrans) in the field to evaluate the California tiger salamander habitat and associated survey needs within the action area for the Wilfred segment of the three Highway 101 projects.

October 8, 2003: Service received initial site assessments for the California tiger salamander for the Northern and Central project segments of the three Highway 101 projects.

November 6, 2003: Dan Buford of the Service discussed the California tiger salamander drift fence survey scheduling for the Northern and Central projects with SCTA's consultant, Michael Fawcett/Merritt-Smith.

November 13, 2003: Jim Browning of the Service provided SCTA and their consultants with written guidance on California tiger salamander surveys in the Northern and Central projects.

November 14, 2003: Dan Buford of the Service informed SCTA that they missed the current California tiger salamander survey season for the Northern and Central project segments.

February 10, 2004: Cay Goude, Dan Buford, Jim Browning, and Catrina Martin of the Service attended a coordination meeting with FHWA, Caltrans, SCTA, and their representatives to discuss a "corridor" approach that would combine consultation for the Northern, Wilfred, and Central projects.

March 18, 2004: The Service received the *Natural Environmental Study/Biological Assessment for the Highway 101 Improvement Project From the Rohnert Park Expressway to the Wilfred Interchange (Wilfred Project) 04-SON-101- KP 23.4/25.0 (PM 14.5/15.5) EA# 129650*, dated March 1, 2004.

April 30, 2004: The Service received the *Report on California Tiger Salamander (Ambystoma Californiense) Pitfall Trap Surveys for the Highway 101 Widening Project, Sonoma County, California*, dated April 21, 2004.

June 9, 2004: The Service received the *Wilfred Avenue Interchange Project Initial Study (CEQA) and Environmental Assessment (NEPA)* from Caltrans along with a letter of invitation, dated July 19, 2004, to attend a public hearing.

June 21, 2004: The Service received the revised *Natural Environmental Study/Biological Assessment Highway 101 Improvement Project From the Rohnert Park Expressway to the Wilfred Interchange (Wilfred Project) 04-SON-101- KP 22.4/25.0 (PM 13.9/15.5) EA# 129650*, along with a letter, dated June 8, 2004, stating FHWA's intentions to request formal consultation with a forthcoming combined biological assessment for the corridor approach.

August 2004: The Service received the *Highway 101 Widening and Improvement Projects: Old Redwood Highway in Petaluma to Rohnert Park Expressway in Rohnert Park (Southern Project) (04-SON-101-KP 12.1/22.4), Wilfred Avenue Interchange Project (04-SON-101- KP 23.4/25.0), and Steele Lane in Santa Rosa to Windsor River Road in Windsor (Northern Project) (04-SON-101-KP 34.9/47.2) Focused Corridor Biological Assessment for the Sonoma County Distinct Population Segment of the California Tiger Salamander*. (The Southern Project would later be referred to by SCTA as the Central Project.)

October 26, 2004: The Service received the revised *Highway 101 Widening and Improvement Projects: Old Redwood Highway in Petaluma to Rohnert Park Expressway in Rohnert Park (Southern Project) (04-SON-101-KP 12.1/22.4), Wilfred Avenue Interchange Project (Wilfred Project) (04-SON-101- KP 23.4/25.0), and Steele Lane in Santa Rosa to Windsor River Road in Windsor (Northern Project) (04-SON-101-KP 34.9/47.2) Focused Corridor Biological Assessment for the Sonoma County Distinct Population Segment of the California Tiger Salamander*, along with a letter from FHWA, dated October 25, 2004, requesting formal consultation on the Highway 101 corridor projects.

May 10, 2005: Chris Nagano and John Cleckler, of the Service met with David Yam and Ray Akkawi of Caltrans to discuss the project overview and consultation planning.

May 18, 2005: Chris Nagano and John Cleckler, of the Service, representatives from Caltrans, SCTA, Parsons, and Michael Fawcett met in the field to conduct a general project alignment reconnaissance.

May 26, 2005: The Service received an additional copy of the document titled *Highway 101 Widening and Improvement Projects: Old Redwood Highway in Petaluma to Rohnert Park Expressway in Rohnert Park (Southern Project) (04-SON-101-KP 12.1/22.4), Wilfred Avenue Interchange Project (Wilfred Project) (04-SON-101- KP 23.4/25.0), and Steele Lane in Santa Rosa to Windsor River Road in Windsor (Northern project) (04-SON-101-KP 34.9/47.2) Focused Corridor Biological Assessment for the Sonoma County Distinct Population Segment of the California Tiger Salamander*, originally received by the Service on October 26, 2004.

June 8, 2005: The Service received GIS information from Caltrans for the Wilfred project segment.

June 15, 2005: The Service received additional information from Caltrans for the Central Project via electronic mail. The Service also received a revised copy of the *Draft Natural Environment Study/Biological Assessment for the Highway 101 HOV Lane Widening and Improvement Project: Old Redwood Highway, Petaluma to Rohnert Park Expressway, Rohnert Park*, from Parson with a letter of transmittal dated June 14, 2005.

June 27, 2005: The Service received revised GIS information for all three Highway 101 projects from Caltrans.

June 30, 2005: The Service received revised GIS information for the Wilfred project segment from Caltrans.

July 6, 2005: The Service met with Caltrans to discuss the use of the interim Santa Rosa Conservation Strategy to determine appropriate compensation for effects to the California tiger salamander and the three listed plants. The Service also described the outstanding information needs required from Caltrans/SCTA to initiate formal consultation.

July 25, 2005: The Service met with Caltrans to demonstrate the use of the Conservation Strategy to assess project effects and appropriate compensation ratios for California tiger salamander and the three listed plants. The Service used GIS to determine the portions of the action area that would be considered listed species habitat for which compensation would be appropriate under the interim Conservation Strategy guidelines.

October 12, 2005: The Service mailed data to Caltrans showing the California tiger salamander and listed plant habitat areas within the action area as determined by the Service's analysis. This information was also provided to demonstrate the amount and location of species' habitat for which appropriate compensation will be required. Caltrans was asked to review the information and contact the Service for relevant questions or to schedule a meeting if necessary. Alex McDonald, of Caltrans, confirmed that the delivery was received on October 13, 2005.

October 14, 2005: The Service sent the project description from the draft biological opinion to Caltrans via electronic mail for review along with a requested clarification on various items. The project description included all three project segments.

October 17, 2005: The Service requested additional information from Caltrans, via electronic mail, regarding the habitat types and boundaries within an area of the Wilfred Project referred to as the 035 Property.

October 19, 2005: In response to the October 17, 2005, request, Hal Durio, of Caltrans, provided relevant information to the Service via electronic mail.

October 20, 2005: The Service asked Caltrans via electronic mail if Caltrans anticipated design changes that would change the size of the proposed action area.

October 24, 2005: In response to the October 20, 2005, question, Hal Durio of Caltrans replied via email that Caltrans did not anticipate any further design changes to the Wilfred Project.

January 17, 2006: The Service received electronic mail from Caltrans that included an attached letter from FHWA to Wayne White, of the Service, requesting the decoupling of the three Highway 101 projects.

January 31, 2006: Cay Goude, of the Service, sent Jeffrey Jensen, of Caltrans, an electronic email explaining how the three projects could not be decoupled for consultation.

February 16, 2006: Via electronic mail, the Service provided Caltrans with the acreage of effects to California tiger salamander and listed plant habitat resulting from the proposed action and associated compensation requirements. The acreages were the result of Service analysis which was based on the GIS-based project information provided to the Service by Caltrans, along with aerial photography and the Conservation Strategy.

February 22, 2006: The Service provided Caltrans with the Interim Conservation Strategy Guidelines via electronic mail.

March 14, 2006: The Service met with FHWA, Caltrans, SCTA, Sonoma County, and SCTA's consultant in the Service's Sacramento office to discuss issues related to continuing consultation on the proposed project.

March 15, 2006: Via electronic mail, the Service provided Caltrans with the project description section of the draft biological opinion for review.

March 16, 2006: Following a request from Caltrans on March 16, 2006, the Service provided Caltrans with contact information for Tracy Love of the California Department of Fish and Game via electronic mail. It was Caltrans' desire to contact Tracy Love to gain access to GIS information associated with the Conservation Strategy.

March 23, 2006: Vincent Griego, John Cleckler, and Joni Mitchell of the Service met with Chris States (Caltrans biologist), Alex McDonald (Caltrans landscape specialist/GIS), Guy Preston (SCTA), Liam Davis (California Department of Fish and Game), and Conrad Kim Franchi (Parsons, project manager/engineer) to discuss the Service's use of the Conservation Strategy and GIS applications to analyze the project affects to California tiger salamander and the listed plants.

March 24, 2006: Jeffrey Jensen of Caltrans requested a copy of the draft biological opinion for the proposed project for review.

March 27, 2006: The Service provided Caltrans with the project description portion of the draft biological opinion.

April 6, 2006: The Service provided Caltrans and SCTA with GIS files demonstrating the Services' analysis of California tiger salamander habitat within the proposed action area. This analysis was based on the GIS-based project information provided to the Service by Caltrans, along with aerial photography and the Conservation Strategy.

May 2, 2006: The Service received revised action area boundary information for the Central Project in a GIS format from Caltrans, via electronic mail. The change was based on a revised project design using 2:1 slopes.

May 5, 2006: The Service received figures from Caltrans via electronic mail. The figures identified specific portions of the action area that had been identified by the Service as habitat for the California tiger salamander. Caltrans and SCTA requested that the Service consider their rationale as to why these locations should not be considered California tiger salamander habitat. The Service met Caltrans and SCTA in the field to discuss these issues on June 1, 2006.

May 18, 2006: The Service received revised action area boundary information for the Northern project segment in a GIS format from Caltrans via electronic mail. The change was based on a revised project design using 2:1 slopes.

June 1, 2006: The Service met Caltrans and SCTA in the field to discuss the exclusion of specific locations within the proposed project area from potential California tiger salamander habitat.

June 6, 2006: The Service received a revised project description from Guy Preston of SCTA via electronic mail.

June 15, 2006: The Service sent the results of their effects analysis for the project locations visited on June 1, 2006, to Caltrans, SCTA, and Liam Davis, of the California Department of Fish and Game, via electronic mail.

July 28, 2006: The Service received revised GIS information from Caltrans via electronic mail.

August 11, 2006: The Service received a revised project description from Guy Preston of SCTA via electronic mail.

August 29, 2006: The Service provided SCTA and Caltrans with the project description section from the draft biological opinion via electronic mail for comment and review.

August 31, 2006: Guy Preston of SCTA approved the project description provided to SCTA and Caltrans on August 29, 2006 via electronic mail.

August 31, 2006: At the request of Guy Preston of SCTA, the Service provided Scott Wilson and Liam Davis of the California Department of Fish and Game with the draft biological opinion via electronic mail for comment and review.

October 11, 2006: The Service received comments from Scott Wilson of the California Department of Fish and Game regarding their review of the draft biological opinion.

October 16, 2006: The Service provided SCTA and Caltrans with the revised project description section from the draft biological opinion via electronic mail for comment and review. Requested text received from the California Department of Fish and Game on October 11, 2006, was incorporated into the revision.

October 16, 2006: Guy Preston of SCTA approved the project description provided to SCTA and Caltrans via electronic mail.

## **BIOLOGICAL OPINION**

### **Description of Proposed Action**

The proposed project "corridor" consists of three interrelated, yet independent projects located on Highway 101 between the cities of Windsor and Petaluma in Sonoma County, California. The projects are identified as the approximately 63.38 acre (25.65 hectare) and 7.6-mile (12.23 kilometer) long Northern Project from Steele Lane in Santa Rosa to Windsor River Road in Windsor; the approximately 26.43 acre (10.70 hectare) and 1-mile (1.61 kilometer) long Wilfred Project from Rohnert Park Expressway to Santa Rosa Avenue in Rohnert Park; and the approximately 83.06 acre (33.61 hectare) and 6.4-mile (10.30 kilometer) long Central Project from Old Redwood Highway in Petaluma to Rohnert Park Expressway in Rohnert Park. (The Central Project was initially referred to as the Southern Project during the first stages of consultation. All project lengths and areas are based on GIS information provided by Caltrans on June 27, 2005; June 30, 2005; May 2, 2006; May 18, 2006; and July 28, 2006.) The combined area for the three highway 101 projects is approximately 172.83 acres (69.94 hectares). The three projects are combined in this biological opinion because of their interrelated and interdependent nature as defined at 50 CFR 402 and as a result of an agreement reached during the February 10, 2004, meeting between the Service, Caltrans, FHWA, and SCTA to combine formal consultation for these three projects. It was also established at the February meeting that these three projects would be constructed by at least three separate construction contracts. These three projects may be further divided into phases, defined as separate construction contracts, which will be at the discretion of Caltrans, FHWA, and SCTA. Accordingly, this biological opinion shall apply to each project or project phase independently provided they are located within the described action area.

The Northern Project

The proposed action in the Northern Project consists of widening Highway 101 from four to six lanes; widening the Highway 101 road shoulders; modifying and adding new drainage structures; widening, extending and adding auxiliary lanes; modifying interchanges; modifying the bridges at Mark West Creek, Poole Creek and Pruitt Creek; realigning and reconstructing ramps, which include California Highway Patrol (CHP) enforcement areas and High Occupancy Vehicle (HOV) bypass lanes; installing ramp metering, closed circuit cameras, changeable message signs, overhead signs, new traffic signals, traffic monitoring stations, and a highway advisory radio system; and constructing retaining walls and sound walls. The project includes a collector/distributor road on the west side of Highway 101, between Airport Boulevard and Fulton Road, which includes new north and south-bound bridges over Mark West Creek. It also includes a new bridge over Mark West Creek on the east side of Highway 101 to accommodate a new off ramp from northbound Highway 101 to Airport Boulevard.

The Wilfred Project

The proposed action in the Wilfred Project consists of widening Highway 101 from four to six lanes; widening the Highway 101 road shoulders; modifying and adding new drainage structures; constructing auxiliary lanes and a new undercrossing connecting Golf Course Drive to Wilfred Avenue; replacing the Wilfred Overhead bridge; modifying interchanges and ramps, which include CHP enforcement areas, HOV bypass lanes, and express bus pads; constructing a collector/distributor between southbound 101 at the Santa Rosa Avenue on ramp and the new Wilfred Avenue off ramp, which includes a new bridge over Wilfred Avenue; installing ramp metering, overhead signs, new traffic signals; constructing retaining walls; widening, realigning and reconstructing local roads; and the expansion of a park-and-ride lot.

The Central Project

The proposed action in the Central Project consists of widening Highway 101 from four to six lanes; widening the Highway 101 road shoulders; modifying and adding new drainage structures; adding a northbound climbing lane over the Cotati Grade from north of Old Redwood Highway in Petaluma to the Sierra Avenue off ramp; modifying a truck brake inspection area; realigning and reconstructing ramps, which include CHP enforcement areas and HOV bypass lanes; installing ramp metering, closed circuit cameras, changeable message signs, overhead signs, new traffic signals, traffic monitoring stations, and a highway advisory radio system; replacing the undercrossing bridges at Route 116 (west) and Railroad Avenue; widening bridges at Willow Brook Creek and Sierra Avenue; replacing the southbound bridges at Laguna De Santa Rosa and Copeland Creek and connecting them to the existing northbound bridges; widening Route 116 at the interchange of Highway 101; adding and modifying auxiliary lanes; and constructing retaining walls and soundwalls.

### Construction Methods

Construction activities will include grading and building a new structural section for the widening of the highway. Grading will include cutting into existing hillsides and embankments and using the soil for the construction of new embankments. Bridge, wall, sign, and lighting construction will include excavation for foundations and pile installation. Piles may include steel, timber, or concrete materials. Installation may include driving and or drilling methods. Foundation work at various locations may require the use of cofferdams to control water. Drainage work will include the replacement and extension of culverts. In some cases, water diversion will be necessary.

### Construction Equipment

Construction equipment will likely include loaders, graders, pavers, cranes, hoe rams, pile drivers, vibratory hammers, excavators, backhoes, hauling and dump trucks, compactors, portable generators, boom trucks, concrete trucks, saws, pumps, jackhammers, site trailers, storage boxes, and liquid storage tanks.

### Restoration and Erosion Control

Areas of temporary disturbance will be restored concurrently with project construction. The goal will be to reestablish contours and vegetation cover to pre-construction conditions in accordance with Caltrans/SCTA requirements. All construction spoils and debris will be removed and disposed of at a permitted disposal site. Riparian areas will be restored to their pre-construction condition or enhanced. Permanent erosion control will be installed as determined necessary by the State and local permitting agencies. At a minimum, the banks of drainages will be stabilized using certified weed-free straw bales, biodegradable jute, or other appropriate methods (e.g., sediment lots). More aggressive erosion control treatments will be implemented as needed.

### Operation and Maintenance

Post-construction operation of the three Highway 101 projects will include general maintenance activities such as repair and replacement of guard rails; shoulder grading; resurfacing and repaving; cleaning and maintenance of drainage ditches; culvert replacement; and vegetation management by mowing and the limited use of herbicides.

### Scheduling

Construction of the first phase of the first project is scheduled to begin as early as summer 2007. Subsequent projects and or project phases within the action area will be at the discretion of Caltrans, SCTA, and FHWA. It is anticipated construction of all phases will commence no later than September of 2016.

Avoidance and Conservation Measures

Caltrans and SCTA propose to avoid, minimize, and compensate for effects to the California tiger salamander and the three listed plants through the following measures:

1. Caltrans/SCTA will compensate for the loss of 50.17 acres (20.29 hectares) of California tiger salamander habitat with the acquisition and preservation of 43.59 acres (17.62 hectares) of habitat for the California tiger salamander. Compensation will be achieved by one or more of the following methods: establishment of a conservation easement, development of a management plan, and provision of a perpetual endowment sufficient to cover management and maintenance of protected lands for the benefit and recovery of California tiger salamander; or purchase of credits in a conservation bank approved by the Service to sell California tiger salamander credits in Sonoma County. Funds may be donated to the Santa Rosa Plain Conservation Strategy administered by the California Wildlife Foundation to compensate for the effects of the action on the 18.09 acres (7.32 hectares) of California tiger salamander dispersal habitat as shown in the following Table 1 at 0.2:1 (i.e., 3.61 acres [1.46 hectares]) in lieu of acquiring and preserving 3.61 acres (1.46 hectares) of the 43.59 acres (17.62 hectares).

As this action covers three (3) independent projects, with multiple construction phases along an approximately 23-mile (37 kilometer) corridor, compensation may be achieved for each project and project phase independently as shown in the following tables 1 and 2. The calculations used to determine the values in the following Table 1 are as defined by the interim guidance for the Conservation Strategy (Conservation Strategy Team 2005b). Adjustments to areas of effects and corresponding compensations will be based upon the final design of each project and project phase within the action area prior to construction with written concurrence from the Service. Caltrans/SCTA may acquire shared credits for the California tiger salamander and the three listed plants should they purchase such at a Service-approved bank or other Service-approved alternative consistent with the methodology described in the Santa Rosa Plain Conservation Strategy (Conservation Strategy Team 2005a).

**Table 1.** Compensation for loss of California tiger salamander habitat by project.

<b>Affected Area</b>	<b>Northern Project (acres/hectares)</b>	<b>Wilfred Project (acres/hectares)</b>	<b>Central Project (acres/hectares)</b>	<b>Total (acres/hectares)</b>
Within 500 feet of an individual California tiger salamander at 2:1	0	1.68/0.68	4.92/1.98	6.60/2.66
Within 500 and 2200 feet of a known California tiger salamander breeding site at 2:1	0	0	9.20/3.72	9.20/3.72
Within 2200 feet and 1.3 miles of a known California tiger salamander breeding site at 1:1	0	3.47/1.40	20.71/8.38	24.18/9.78
Within California tiger salamander dispersal habitat at 0.2:1	3.14/1.27	0	0.47/0.19	3.61/1.46
<b>Total for California Tiger Salamander</b>	<b>3.14/1.27</b>	<b>5.15/2.08</b>	<b>35.30/14.27</b>	<b>43.59/17.62</b>

Caltrans/SCTA will compensate for the loss of 4.56 acres (1.85 hectares) of listed plant habitat with the acquisition, restoration, or construction; and preservation of 12.28 acres (4.97 hectares) of habitat for Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam. Compensation for the three listed plants will be accomplished according to a Service-approved mitigation and management plan. The calculations used to determine the values in the following Table 2 are as defined by the 1998 *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects that may Affect Four Endangered Plant Species of the Santa Rosa Plain, California* (1998 Plant Programmatic Opinion) (Service 1998).

**Table 2.** Compensation for loss of listed plant habitat by project.

<b>Affected Area</b>	<b>Northern Project</b> (acres/hectares)	<b>Wilfred Project</b> (acres/hectares)	<b>Central Project</b> (acres/hectares)	<b>Total</b> (acres/hectares)
Three listed plants at 1:1 for the potential presence in seed bank of suitable wetland habitat	0	0.7/0.28 creation	0	0.7/0.28 creation
Three listed plants at 3:1 for presence	10.83/4.38 preservation	0	0.75/0.30 preservation	11.58/4.69 preservation
<b>Total for the three listed plants</b>	<b>10.83/4.38</b> preservation	<b>0.7/0.28</b> creation	<b>0.75/0.30</b> preservation	<b>12.28/4.97</b> creation and preservation

Affects in the Northern Project area, north of Santa Rosa Creek, will be compensated by preservation or establishment of either Burke's goldfields or Sonoma sunshine. This compensation will be approved in advance by the California Department of Fish and Game. Sebastopol meadowfoam will not be used to mitigate the affects to plants in the area north of Santa Rosa Creek. Caltrans/SCTA will not begin ground-breaking until they have received approval from the California Department of Fish and Game and the Service in writing of the form and amount of the financial security for the land acquisition and management endowment fund.

The Service, FHWA, Caltrans, and SCTA understand that there may be refinement regarding the acreage of wetlands and the associated listed plant habitat for the project based on new plant survey information. Upon refinement of these acreages, the compensation for effects to the three listed plants will to be based on the ratios from the 1998 Plant Programmatic Opinion. In addition, all parties agree if the ratios increase in a new programmatic biological opinion for the listed plants and California tiger salamander, the ratios for this proposed action will continue to be based on the 1998 programmatic biological opinion.

2. Erosion and Sediment Control Plan. Caltrans/SCTA will prepare and implement an erosion control and restoration plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities. The plan will include all the necessary local jurisdiction requirements regarding erosion control and will implement Best Management Practices (BMP's) for erosion and sediment control as required. Only appropriate native plant material will be used for erosion control and restoration. Erosion control will be placed on all disturbed slopes and material disposal sites as directed by the Caltrans Erosion Control Branch.

3. Storm Water Pollution Prevention Plan (SWPPP). Caltrans/SCTA will submit to the Regional Water Quality Control Board (RWQCB) a notice of intent to discharge stormwater before construction and/or operation activities begin and will develop and implement a SWPPP as required by the conditions of a National Pollutant Discharge Elimination System (NPDES) permit. Caltrans/SCTA will prepare a SWPPP that identifies BMP's for discharges and groundwater disposal from dewatering operations associated with road construction and interchange improvements. The SWPPP will identify how and where these discharges would be disposed of during construction and operations. The SWPPP will include provisions for the following:
  - a. Construction activities will be limited, such as to minimize the area of ground disturbance. No disturbance will be allowed outside the limits of applicable permits. Preservation of existing vegetation will be provided to the maximum extent possible. To minimize effects to California tiger salamander habitat, all required BMP's will be in place during the construction of each phase of each project. Sensitive areas will be marked with high visibility fencing to clearly identify the construction area relative to sensitive areas.
  - b. Installation of temporary erosion control devices will be an integral part of construction. Sedimentation fences will be used to contain polluted or turbid run-off from the work site. Other methods of temporary erosion control, including but not limited to hay bail check dams, will be employed to protect riparian areas, streams and water courses, and all other areas susceptible to damage from run-off. Erosion control devices will be installed concurrently with construction earthwork.
  - c. A stabilized construction entrance/exit will be constructed for any access point within 200 feet (61 meters) of a body of water to reduce the tracking of mud and dirt.
  - d. Clear water diversion will only be used when necessary to isolate construction activities occurring within or near a water body, such as stream bank stabilization, or culvert, bridge, pier or abutment installation. Clear water diversion will only be implemented where allowed by appropriate regulatory permits. De-watering or return water diversion flows will be controlled by piping channel lining, non-erosive grades, or other means to reduce erosion and water turbidity of streams. At the completion of the construction activity requiring de-watering or diversion, stream or gully banks will be immediately restored to allow water to follow along its original course.
  - e. Material from excavation and grading activities will be used in the construction of engineered embankments, wherever possible. Excess materials from excavation activities will be hauled and disposed of at a permitted site. The disturbed right-

of-way will be reseeded with the appropriate seed mixture. Spoils materials will not be placed in sensitive habitat areas, such as wetlands, or in Federal Emergency Management Agency (FEMA)-identified floodplains.

- f. Dedicated fueling areas and refueling practices shall be designated. If possible, dedicated refueling areas will be located at least 200-feet (61 meters) from a body of water. Dedicated fueling areas shall be protected from storm water run-on and run-off, and shall be located at least 50 feet (15.24 meters) from downstream drainage facilities. Fueling must be performed on level-grade areas. On site fueling shall only be used where it is impractical to send vehicles and equipment off site for fueling. When fueling must occur onsite, the contractor will designate an area to be used subject to approval of the Resident Engineer, representing either Caltrans or SCTA. Drip pans or absorbent pads will be used during on-site vehicle and equipment fueling.
  - g. Spill control BMP's will be implemented anytime chemicals and/or hazardous substances are stored or used on the projects. Employees shall be educated in proper material handling, spill prevention, and clean-up. Clean-up materials shall be on-site and located near material storage and use.
  - h. The temporary stockpiling of all materials will be located a minimum of 50 feet (15.24 meters) away from concentrated flows of storm water, drainage courses, and inlets. Stockpiles of "cold mix" asphalt materials will be placed on and covered with plastic or comparable material prior to the onset of precipitation. All other stockpiles will be covered, protected with soil stabilization measures, and a temporary perimeter sediment barrier, prior to the onset of precipitation.
  - i. Erosion control devices will be monitored on a regular basis and augmented as necessary. In the event of pending storms, and in compliance with the SWPPP, erosion control devices will be inspected to ensure that such devices are in place and are functional. Monitoring and maintenance of erosion control devices and adjacent disturbed areas will continue during and immediately after significant storm events.
4. Access Points and Staging Areas. If possible, construction access points and staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants will be on-site and within the construction right-of-way. If on-site staging is not sufficient for construction operations, off-site staging may be considered. A qualified biologist will survey any proposed off-site staging area to determine if sensitive resources are located on the site that would be disturbed by staging activities. If sensitive resources are found, an appropriate buffer zone will be staked and flagged as necessary to avoid impacts. If sensitive resources cannot be avoided, the site will not be used. SCTA/Caltrans will either obtain or ensure

that its contractor obtains all required regulatory permits, including approval of the Service, for off-site construction access points and staging areas. All required BMP's for Storm Water Pollution Prevention (Avoidance and Conservation Measure #2) will be implemented in staging areas.

5. Construction Windows: Construction will be limited to the dry season (June 1st- October 31) in aquatic habitat when drainages and wetlands would be either dry or at their lowest water level to minimize impacts to aquatic resources including the potential for take of breeding/migrating California tiger salamanders. Vegetation clearing will be confined to the minimal area necessary to facilitate construction activities. California tiger salamander habitat that can be avoided during construction will be flagged and designated as an Environmentally Sensitive Area. All construction personnel will avoid these areas.
6. Biological Monitoring and Environmental Training. Caltrans/SCTA will provide appropriate biological monitoring staff (biological monitor) to meet the requirements established in the National Environmental Policy Act (NEPA) and Endangered Species Act processes including the conservation measures and terms and conditions described in this biological opinion. At least 15 days prior to the onset of construction activities Caltrans/SCTA shall submit the names(s) and credentials of biologists who will conduct activities specified in the following measures. The main responsibility of the biological monitor will be to minimize the potential take of listed species and disturbance of sensitive environmental resources during construction activities. This will be accomplished through implementation of the projects' environmental commitments, conservation and avoidance measures to achieve environmental compliance with all the permit conditions. Specific tasks to be carried out by the biological monitor include the following:
  - a. The designated biologist will inform field management and construction personnel of the need to avoid and protect resources. A worker environmental awareness program will be prepared and delivered to construction personnel. The program will provide workers with information on their responsibilities with regard to the California tiger salamander. Construction personnel will be educated on the types of sensitive resources located in the project area and the measures required to avoid effects on these resources. Personnel will attend an environmental training program before groundbreaking activities for each individual construction contract. Materials covered in the training program will include environmental rules and regulations for the projects and requirements for limiting activities to the construction right-of-way and avoiding demarcated sensitive resources areas. Training will educate construction supervisors and managers on: the need for resource avoidance and protection; construction drawing format and interpretation; staking methods to protect resources; the construction process; roles and responsibilities; project management structure and contacts; environmental commitments; and emergency procedures.

- b. Prior to the start of construction activities, the biologist will survey each project area for California tiger salamander. If a California tiger salamander is found, the designated biologist shall contact the Service to determine if moving the salamander is appropriate. If the Service approves moving animals, the biologist shall be allowed sufficient time to move the salamander from the work site before construction activities begin. Only designated biologist(s) shall participate in activities associated with the capture, handling, and monitoring of California tiger salamanders.
  - c. Prior to the start of construction, the designated biologist will identify and mark sensitive and riparian areas. The contractor will not disturb riparian or wetland areas, marked or otherwise, unless indicated on construction plans. Temporary siltation fencing will be installed in advance of construction activity as indicated on the construction plans. Physical protective measures will remain on site and in good repair until all construction activities in that zone are complete. Protective measures will be removed in consultation with the biologist and/or environmental compliance monitors.
  - d. The designated biologist will be active on the project, until such time as all environmental training, surveys, relocation of California tiger salamander, and marking of sensitive and riparian areas is complete. After this time, the contractor or permittee will designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives the training outlined in Measure 6a and in the identification of California tiger salamanders. The monitor and the Service-approved biologist will have the authority to suspend any action that might result in impacts that exceed the levels anticipated by FHWA/Caltrans/SCTA and Service during review of the proposed action.
  - e. The designated biologist will ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas will be removed.
7. Restoration. The contractor will restore all temporarily disturbed areas to conditions that are equal to or better than the original conditions in accordance with SCTA and Caltrans requirements. Site restoration will be completed concurrently with project construction. All debris, construction spoils, remaining installation materials, and miscellaneous litter will be removed for proper off-site disposal. Stream bank contours will be reestablished following construction and permanent erosion control will be installed if necessary. Drainage banks will be stabilized using certified weed-free straw bales, biodegradable jute, or other appropriate methods (e.g., sediment lots). More aggressive erosion control treatments will be implemented as needed. Where appropriate, discarded soil will be left in a roughened condition to reduce erosion and promote re-vegetation. Permanent

erosion control measures will be implemented following completion of construction on an as-needed basis.

8. Caltrans/SCTA will attempt to translocate any listed plants, including their seeds and/or soils containing seeds, within the action area under the authorization and direction of the Service and as outlined in the Conservation Strategy.
9. Upon completion of the proposed action, all listed plant habitat subject to temporary ground disturbances, including storage and staging areas, temporary roads, etc. will be re-contoured, if appropriate, and revegetated with seeds and/or cuttings of appropriate plant species to promote restoration of the area to pre-project conditions. Restoration of listed plant habitat will be included in the restoration and revegetation plan that Caltrans/SCTA will submit in regards to temporary actions in California tiger salamander habitat within the action area.

This action covers construction of all projects and project phases that commence within 10-years of the date of this action. This action covers all maintenance activities of the Highway 101 corridor, within the limits of these projects.

### **Action Area**

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” Based on GIS information provided by Caltrans on June 27, 2005; June 30, 2005; May 2, 2006; May 18, 2006; and July 28, 2006, the action area for the proposed action includes all lands associated with the approximately 63.38 acre (25.65 hectare) Northern Project; the approximately 26.43 acre (10.70 hectare) Wilfred Project; and the approximately 83.06 acre (33.61 hectare) Central Project footprints and roads (except for County roads, and State and Federal highways) and other areas accessed by project vehicles.

### **Status of Species**

#### California Tiger Salamander

The Sonoma County Distinct Population Segment of the California tiger salamander was emergency listed as endangered on July 22, 2002 (Service 2002) and later listed as endangered on March 19, 2003 (Service 2003). The listing was revised to threatened on August 4, 2004 (Service 2004a). This latter listing changed the status of both the Santa Barbara and Sonoma county populations from endangered to threatened and newly listed the Central Valley population as threatened. On August 19, 2005, U.S. District Judge William Alsup vacated the Service’s down-listing of the Sonoma and Santa Barbara populations from endangered to threatened. The Sonoma and Santa Barbara populations are now listed as endangered. On August 10, 2004, the Service proposed 47 critical habitat units in 20 counties for the Central California population

(Service 2004b). Final critical habitat was designated for the Central California population on August 23, 2005 and included 199,109 acres (80,576 hectares) in 19 counties (Service 2005a). The Service proposed 74,223 acres (30,037 hectares) of critical habitat in the Santa Rosa Plain in central Sonoma County on August 2, 2005 (Service 2005b). The Conservation Strategy was finalized by The Service, in cooperation with a multi-disciplinary and interest team and released on December 7, 2005. This document includes a comprehensive conservation strategy for the Sonoma County Distinct Population Segment of the California tiger salamander (Conservation Strategy Team 2005a). On December 14, 2005, the Service identified a 17,418 acre (7048.8 hectare) area of the Santa Rosa Plain that meets the criteria for critical habitat for the Sonoma County Distinct Population Segment of the California tiger salamander. However, the Service announced that it had excluded all of the acreage from the critical habitat designation based on interim strategies and conservation measures being implemented by local agencies, and because of potentially adverse economic impacts (Service 2005c).

The California tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and inner coast ranges (Jennings and Hayes 1994; Storer 1925; Shaffer *et al.* 1993). The species has been recorded from near sea level to approximately 3,900 feet (1188.7 meters) in the Coast Ranges and to approximately 1,600 feet (487.7 meters) in the Sierra Nevada foothills (Shaffer *et al.* 2004). Along the coast ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County.

The Sonoma County Distinct Population Segment of the California tiger salamander is discrete in relation to the remainder of the species. The population is geographically isolated and separate from other California tiger salamanders. The Sonoma County population is widely separated geographically from the closest populations, which are located in Contra Costa, Yolo, and Solano counties. These populations are separated from the Sonoma County population by the Coast Range, Napa River, and the Carquinez Straits, at a minimum distance of approximately 45 miles (72 kilometers). There are no known records of the California tiger salamander in the intervening areas (D. Warenycia, California Department of Fish and Game, personal communication with the Service, 2002). We have no evidence of natural interchange of individuals between the Sonoma County population and other California tiger salamander populations. As detailed below, this finding is supported by an evaluation of the genetic variability of the species.

Sonoma County Distinct Population Segment of the California tiger salamander inhabits low-elevation (below 300 feet [91 meters]) vernal pools and seasonal ponds, associated grassland, and oak savannah plant communities. The historic range of the Sonoma County population also may have included the Petaluma River watershed, as there is one historic record of a specimen from the vicinity of Petaluma from the mid-1800s (Borland 1856, as cited in Storer 1925).

The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Adults may reach a total length of 8.2 inches (20.8 centimeters) (Petranka 1998). Tiger salamanders exhibit sexual dimorphism with males tending to be larger than females. Tiger salamander coloration generally consists of random white or yellowish markings against a black body. The markings on adults California tiger salamanders tend to be more concentrated on the lateral sides of the body, whereas other tiger salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

The tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae develop in the vernal pools and ponds in which they were born, tiger salamanders are otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer *et al.* 2004; Trenham *et al.* 2001). Because they spend most of their lives underground, tiger salamanders are rarely encountered, even in areas where they are abundant. Subadult and adult tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredó and Van Vuren 1996; Petranka 1998; Trenham 1998a). Although ground squirrels have been known to eat tiger salamanders, the relationship with their burrowing hosts is primarily commensal (Loredó *et al.* 1996; Semonsen 1998).

Tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil as upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for tiger salamanders. Underground refugia also provides protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. California tiger salamanders typically use the burrows of ground squirrels and gophers (Loredó *et al.* 1996; Trenham 1998a). However, Dave Cook (Sonoma County Water Agency, personal communication with the Service, 2001) found that pocket gopher burrows are most often used by California tiger salamanders in Sonoma County. Tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredó *et al.* 1996).

Upland burrows inhabited by tiger salamanders have often been referred to as "aestivation" sites. However, "aestivation" implies a state of inactivity, while most evidence suggests that tiger salamanders remain active in their underground dwellings. A recent study has found that tiger salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because tiger salamanders arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that tiger salamanders are feeding while underground. Recent direct observations have confirmed this (Trenham 2001; van Hattem

2004). Thus, "upland habitat" is a more accurate description of the terrestrial areas used by tiger salamanders.

Tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993; Trenham *et al.* 2000). The breeding period is closely associated with the rainfall patterns in any given year with less adults migrating and breeding in drought years (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Male salamander are typically first to arrive and generally remain in the ponds longer than females. Results from a 7-year study in Monterey County suggested that males remained in the breeding ponds for an average of 44.7 days while females remained for an average of only 11.8 days (Trenham *et al.* 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stockponds. Ideal breeding ponds are typically fishless, and seasonal or semi-permanent (Barry and Shaffer 1994; Petranksa 1998). In Sonoma County, there are a number of records of California tiger salamanders breeding in roadside ditches. Many are in areas where there are no known breeding ponds, and these animals are utilizing the only marginal habitat remaining. Also, many pools in these areas have likely been destroyed, leaving these marginal sites as the only option for breeding.

While in the ponds, adult salamanders mate and then the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranksa 1998). Egg laying typically reaches a peak in January (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). Eggs are often attached to objects, such as rocks and boards in ponds with no or limited vegetation (Jennings and Hayes 1994). Clutch sizes from a Monterey County study had an averaged of 814 eggs (Trenham *et al.* 2000). Seasonal pools may not exhibit sufficient depth, persistence, or other necessary parameters for adult breeding during times of drought (Barry and Shaffer 1994). After breeding and egg laying is complete, adults leave the pool and return to their upland refugia (Loredo *et al.* 1996; Trenham 1998a). Adult salamanders often continue to emerge nightly for approximately the next two weeks to forage amongst their upland habitat (Shaffer *et al.* 1993).

Tiger salamander larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). The peak emergence of these metamorphs is typically between mid-June to mid-July (Loredo and Van Vuren 1996; Trenham *et al.* 2000). The larvae are totally aquatic and range in length from approximately 0.45 to 0.56 inches (1.14 to 1.42 centimeters) (Petranksa 1998). They have yellowish gray bodies, broad flat heads, large feathery external gills, and broad dorsal fins extending well up their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific treefrogs (*Pseudacris regilla*), Western spadefoot toads (*Spea hammondi*), and California red-legged frogs (J. Anderson 1968; P. Anderson 1968; University of California 2005). Tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, they often rest on the bottom in shallow water but are also found throughout the water column in deeper water.

Young salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The tiger salamander larval stage is typically completed in 3 to 6 months with most metamorphs entering upland habitat during the summer (Petranka 1998). In order to be successful, the aquatic phase of this species' life history must correspond with the persistence of its seasonal aquatic habitat. Most seasonal ponds and pools dry up completely during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973).

Larval development and metamorphosis can vary and is often site-dependent. Larvae collected near Stockton in the Central Valley during April varied between 1.88 to 2.32 inches (4.78 to 5.89 centimeters) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left breeding pools 60 to 94 days after eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. Longer ponding duration typically results in larger larvae and metamorphosed juveniles that are more likely to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). Larvae will perish if a breeding pond dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1988) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 sampled pools supported larval California tiger salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only 6 (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998).

Following metamorphosis, juveniles leave their pools and enter upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo *et al.* 1996). Wet conditions are more favorable for upland travel but rare summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until the next winter's rains to move further into more suitable upland refugia. Although likely rare, larvae may over-summer in permanent ponds (University of California 2005). Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer, unpublished manuscript). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for two to five years (Loredo and Van Vuren 1996; Trenham *et al.* 2000).

Lifetime reproductive success for tiger salamander species is low. Results from one study suggest that the average female tiger salamander bred 1.4 times during their lifespan and produced 8.5 young per reproductive effort that survived to metamorphosis (Trenham *et al.*

2000). This resulted in the output of roughly 11 metamorphic offspring over a breeding female's lifetime. The primary reason for low reproductive success may be that this relatively short-lived species requires two or more years to become sexually mature (Shaffer *et al.* 1993). Some individuals may not breed until they are four to six years old. While California tiger salamanders may survive for more than ten years, many breed only once, and in one study, less than five percent of marked juveniles survived to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Dispersal and migration movements made by tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) inter-pond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.* 2001). After breeding, adult tiger salamanders return to upland habitats, where they may live for one or more years before attempting to breed again (Trenham *et al.* 2000).

Tiger salamanders are known to travel large distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but tiger salamanders in Santa Barbara County have been recorded dispersing up to 1.3 miles (2 kilometers) from their breeding ponds (Sweet 1998). Tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 feet (579 to 671 meters) away (Trenham *et al.* 2001). In addition to traveling long distances during juvenile dispersal and adult migration, tiger salamanders may reside in burrows far from their associated breeding ponds.

Although previously cited information indicates that tiger salamanders can travel long distances, they typically remain close to their associated breeding ponds. A trapping study conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer, unpublished manuscript). More juvenile salamanders were captured at traps placed at 328, 656, and 1,312 feet (100, 200, and 400 meters) from a breeding pond than at 164 feet (50 meters). Approximately 20 percent of the captured juveniles, were found at least 1,312 feet (400 meters) from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile salamanders were within 2,099 feet (640 meters) of the pond, with the remaining 5 percent being found at even greater distances. Preliminary results from a 2003-04 trapping effort at the same study site detected juvenile tiger salamanders at even further distances, with a large proportion of the captures at 2,297 feet (700 meters) from the breeding pond (Trenham *et al.*,

unpublished data). During post-breeding emigration from aquatic habitat, radio-equipped adult tiger salamanders were tracked to burrows between 62 to 813 feet (19 to 248 meters) from their breeding ponds (Trenham 2001). These reduced movements may be due to adult California tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

California tiger salamanders are also known to use several successive burrows at increasing distances from an associated breeding pond. Although previously cited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks, than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Documented or potential tiger salamanders predators include coyotes (*Canis latrans*), raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums (*Didelphis virginiana*), egrets (*Egretta* species), great blue herons (*Ardea herodias*), crows (*Corvus brachyrhynchos*), ravens (*Corvus corax*), garter snakes (*Thamnophis* species), bullfrogs (*Rana catesbeiana*), California red-legged frogs, mosquito fish (*Gambusia affinis*), and crayfish (*Procambarus* species). Due to predation, permanent ponds occupied by bullfrogs and exotic fishes are often considered unsuitable as viable breeding habitat (Fisher and Shaffer 1996).

The California tiger salamander is imperiled throughout its range due to a variety of human activities (Service 2004). Current factors associated with declining tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern tiger salamander (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley *et al.* 2003); and predation by introduced species. California tiger salamander populations are likely threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats. Although found elsewhere throughout the range, nonnative tiger salamanders are not yet known to occur within the range of the California tiger salamander in Sonoma County (Service 2004a). Habitat isolation and fragmentation within many watersheds have precluded dispersal between sub-populations and jeopardized the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extinct habitat patches). Other threats include predation and competition from introduced exotic species; possible commercial over-utilization; diseases; various chemical contaminants; road kill; and certain unrestrictive mosquito and rodent control operations. Currently, these various primary and secondary threats are largely not being offset by existing federal, state, or local regulatory mechanisms. The tiger salamander is also prone to

chance environmental or demographic events, to which small populations are particularly vulnerable.

The specific effects of disease on the California tiger salamander are not known. Pathogens, fungi, water mold, bacteria, and viruses have been known to adversely affect other tiger salamander species or other amphibians. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Pathogen outbreaks have not been documented in the Sonoma County population of the California tiger salamander, but Chytrid fungus infections (chytridiomycosis) have been detected in the Central population of the California tiger salamander (Padgett-Flohr 2004). Chytridiomycosis and ranaviruses are a potential threat to the California tiger salamander because these diseases have been found to adversely affect other amphibians, including other species of tiger salamanders (Longcore *in litt.* 2003; Lips *in litt.* 2003). Nonnative species, such as bullfrogs, are located within the range of the Sonoma County population of the California tiger salamander and have been identified as potential carriers of these diseases. Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in tiger salamanders being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small, fragmented remaining Sonoma County population of the California tiger salamander breeding sites, the many stresses on these sites due to habitat losses and alterations, and the many other potential disease-enhancing anthropogenic changes which have occurred both inside and outside the species' range.

Tiger salamanders are generally thought to make good pets by amateur herpetologists (Porras 2002). Federal listing could raise the value of the species within wildlife trade markets, and increase the threat of unauthorized collections above current levels (K. McCloud, Special Agent, Service, personal communication, 2002). Even limited interest in the species could pose a serious threat to the Distinct Population Segment.

The total number of individual California tiger salamanders in Sonoma County is not known. The difficulty of estimating total California tiger salamander population size has been discussed by a number of biologists (Shaffer *et al.* 1993; Jennings and Hayes 1994). However, estimates have been made for a few populations in Monterey (Barry and Shaffer 1994; Trenham *et al.* 1998b). Because data on numbers of individual California tiger salamanders are lacking since these amphibians spend much of their lives underground, and because only a portion of the total number of animals migrate to pools to breed each year, the availability of suitable habitat and documentation of its loss is thus an appropriate method for assessing the status of the species.

The life history and ecology of the California tiger salamander on the Santa Rosa Plain in Sonoma County make it likely that this population has a metapopulation structure (Hanski and Gilpin 1991). A metapopulation is a set of local populations or breeding sites within an area, where typically migration from one local population or breeding site to other areas containing

suitable habitat is possible, but not routine. Movement between areas containing suitable habitat (i.e., dispersal) is restricted due to inhospitable conditions around and between areas of suitable habitat. Because many of the areas of suitable habitat may be small, and support small numbers of salamanders, local extinction of these small units may be common. A metapopulation's persistence depends on the combined dynamics of these local extinctions and the subsequent recolonization of these areas by dispersal (Hanski and Gilpin 1991; 1997; McCullough 1996; Hanski 1999).

The Service believes habitat loss has reduced the sizes and connectivity between patches of suitable and occupied salamander habitat on the Santa Rosa Plain. The reduction in the extent and amount of suitable water bodies, grasslands, and other suitable upland habitats likely has eliminated connectivity among most of the known breeding sites, making recolonization of some sites more difficult following local extinction. In addition, the reduction of habitat below a certain size threshold has the effect of reducing the quality of the remaining habitat by reducing the size of habitat boundaries, and making effects of other factors such as amount of food, availability of rodent burrows, pesticide use, mortality from vehicles, and predators more pronounced given the smaller area now exposed to such impacts. The Service does not have enough data to determine what the size threshold for habitat might be, whereby any further reduction would lower the quality of the remaining habitat. The acreage is probably dependent on factors such as the type of building occurring along habitat boundaries (i.e., residential, industrial, community park), number of roads bordering the habitat and the amount of traffic those roads experience, amount of pesticide use within the breeding pool watershed, or whether domestic animals or people have access to the site during periods when salamanders are vulnerable, such as migrating to or from aestivation sites. The Service believes there is a size threshold for habitat below which the combination of various impacts will result in the loss of more salamanders than the Sonoma County California tiger salamander population can produce, and thus local extinction may occur.

The Santa Rosa Plain has experienced rapid urban growth since the vernal pool ecosystem preservation plan was issued in 1995. From 1995 until 2001, the population of Sonoma County increased by approximately 10 percent with an average annual growth rate of approximately 1.6 percent. (U.S. Census Bureau; California Department of Finance; California Association of Realtors website 2002). Increases in housing, traffic, industry, and office buildings have occurred concurrent with the increase in population growth. As a result, loss of real and potential salamander breeding sites and upland habitat continues to occur in the Santa Rosa Plain. Given the amount of habitat loss, inadequate regulatory mechanisms, and other threats, we believe the remaining California tiger salamanders in Sonoma County are endangered.

Between 2001 and 2002, five documented breeding sites for Sonoma County Distinct Population Segment of the California tiger salamander were destroyed. Loss of real and potential salamander breeding sites, upland refugia, dispersal, and foraging habitat continues to occur in the Santa Rosa Plain. To date (prior to this biological opinion), there have been 16 biological opinions (i.e., section 7 formal consultations) authorizing incidental take to all individuals

inhabiting 431.37 acres (174.57 hectares) of tiger salamander habitat since the emergency listing on July 22, 2002. Two of these 16 biological opinions address adverse and beneficial effects associated with the construction of seasonal wetlands and creation of tiger salamander breeding habitat and establishment of Sebastopol meadowfoam and Sonoma sunshine populations. These two sites are known as the Hazel Mitigation Bank and the Slippery Rock Conservation Bank. The temporary ground disturbance associated with these Banks includes approximately 139.06 acres (56.28 hectares); therefore there has been 292.37 acres (118.32 hectares) of permanent tiger salamander habitat loss permitted by the Service through section 7 consultations with the U.S. Army Corps of Engineers (Corps). The other 14 biological opinions have integrated in their project proposals to conserve 426.6 acres (172.64 hectares) of tiger salamander habitat at Service approved locations within Sonoma County via the purchase of mitigation or conservation credits, recording conservation easements, or offering fee title to the California Department of Fish and Game or another Service approved entity.

### Burke's goldfields

Burke's goldfields was federally listed as endangered on December 2, 1991 (Service 1991). Critical habitat has not been designated for this species. This species' distribution is confined almost entirely within the Santa Rosa Plain and a comprehensive conservation strategy for the Sonoma County population is included in the Conservation Strategy (Conservation Strategy Team 2005a). Burke's goldfields is an annual herb in the aster family (Asteraceae). Full grown plants are typically branched (CNPS 1977) and less than 11.8 inches (30 centimeters) tall (Hickman 1993). Its leaves are opposite, pinnately lobed, and less than 2 inches (5 centimeters) long. Burke's goldfields typically bloom between April and June with yellow, daisy-like inflorescences with separate involucre bracts (leaf-like structures beneath the flower head) (Skinner and Pavlik 1994). Its flowers are insect-pollinated and self-incompatible, meaning that they can set seed only when fertilized by pollen from another individual plant (Ornduff 1966; Crawford and Ornduff 1989). This species produces dry, one-seeded fruits (achenes) that are generally less than 0.2 inches (1.5 millimeters) long. The fruits of Burke's goldfields can be distinguished from those of other goldfields species by the presence of one long awn (bristle and numerous short scales) (Hickman 1993). Smooth goldfields (*Lasthenia glaberrima*) can be distinguished from Burke's goldfields by their partly fused involucre bracts and a pappus (ring of scale-like or hair-like projections at the crown of an achene) of numerous narrowed scales. Common goldfields (*Lasthenia californica*) are distinguished from Burke's goldfields by their lobeless, linear leaves (Hickman 1993). Individual Burke's goldfields plants may exhibit some geographic variation in morphology (McCarten 1985 as cited in CH2M Hill 1995; Patterson *et al.* 1994). Patterson *et al.* (1994) reported robust specimens from the southern Santa Rosa Plain near the Laguna de Santa Rosa and variation in the number of awns from a Lake County population.

Burke's goldfields is endemic to the central California Coastal Range region where it was historically found in Mendocino, Lake, and Sonoma counties (CNPS 1977; Patterson *et al.* 1994). The plant is now considered extirpated in Mendocino County. The two existing

occurrences for Lake County, at Manning Flat and a winery on Highway 29, are presumed extant (still in existence). Otherwise, the remaining distribution seems to be limited to Sonoma County, with the core population primarily located in the northwestern and central areas of the Santa Rosa Plain (CNDDDB 2005). Two additional occurrences are located south of Highway 12, near the Laguna de Santa Rosa (CH2M Hill 1995). Another occurrence has been recorded north of Healdsburg (Patterson *et al.* 1994).

Burke's goldfields are associated with vernal pool and swale wetland habitats generally below 1640-foot (500 meter) elevation (Hickman 1993). The plant has been found in a variety of unique seasonal wetland situations. This includes a series of claypan vernal pools on volcanic ash soils at the Manning Flat occurrence in Lake County (Service 1991; CNDDDB 2005). (Common goldfields and few-flowered navarretia [*Navarretia leucocephala pauciflora*] were also found at the Manning Flat location [CNDDDB 2005]). In Sonoma County, Burke's goldfields are found in vernal pools with nearly level to slightly sloping loam, clay loam, and clay soils. A clay or hardpan layer, approximately 2 to 3 feet (0.6 to 0.9 meters) below the surface, restricts downward movement of water (Service 1991). Burke's goldfields are primarily found in pools with Huichica loam in the northern part of the Santa Rosa Plain (Patterson *et al.* 1994; CNDDDB 2005). This particular soil type consists of a fine textured clay loam on top dense clay and cemented layers (Patterson *et al.* 1994). In the southern portion of the Santa Rosa Plain, the species is likely to be found on Wright loam or Clear Lake clay (Patterson *et al.* 1994; CNDDDB 2005). Wright loam is defined by a fine silty loam on top of dense clay and marine sediments. Clear Lake clay consists of a thick layer of hard dense clay (Patterson *et al.* 1994). Burke's goldfields is often found growing with the listed Sonoma sunshine and Sebastopol meadowfoam (*Limnanthes vinculans*). These listed species are often found with other common vernal pool-associated plants of the Santa Rosa Plain, including Douglas' pogogyne (*Pogogyne douglasii* species *parviflora*), Lobb's aquatic buttercup (*Ranunculus lobbii*), smooth goldfields, California semaphore grass (*Pleuropogon californicus*), maroonspot downingia (*Downingia concolor*), and button-celery (*Eryngium* species) (CNDDDB 2005).

Seed banks are of particular importance to annual plant species, such as Burke's goldfields, which are subject to uncertain or variable environmental conditions associated with a Mediterranean climate (Cohen 1966, 1967; Parker *et al.* 1989; Templeton and Levin 1979). Little is known about the seed life of Burke's goldfields. Circumstantial evidence suggests that Burke's goldfields can successfully germinate from seed banks translocated in soil to other appropriate wetland habitat (C. Wilcox, California Department of Fish and Game, 2000 *in litt.*). As annual species, both Burke's goldfields and Sonoma sunshine are expected to respond to environmental stochastic events, such as changes in vegetative composition, climate, and disturbance, by partial germination of its seed bank. As with other annuals, Burke's goldfields are adapted to "risky environments" by producing persistent seed banks to offset years of low reproductive success and ensure persistence at a given location without immigration (Baskin *et al.* 1998). It is likely that Burke's goldfields can persist in the seed bank as dormant embryos for an undetermined number of years. Therefore this species may persist undetected for years until conditions are favorable for germination. Although formal studies of Burke's goldfields seed

viability have not been conducted, it is reasonable to expect seed banks to persist for extended periods without germination, and individual may be predisposed to variable germination requirements as a survival strategy.

A standard above-ground botanical survey may not accurately reflect the total number of plants at any given time for species with long-lived seed banks (Rice 1989; Given 1994). With this understanding, overall annual plant populations associated with seasonal wetland habitats can fluctuate between abundant to seemingly nonexistent from year to year dependent on a variety of environmental conditions. Therefore, it is difficult to determine when true extirpation has occurred in historically occupied habitat. Furthermore, short-term population may be more indicative of current environmental conditions rather than long-term habitat suitability (Given 1994).

Of the 48 known records of Burke's goldfields, 26 are presumed to remain extant, with the majority found on the Santa Rosa Plain. Four populations occur outside of the Santa Rosa Plain, of which only two populations, one in northern Healdsburg and one at the Ployes winery, are extant. This species continues to be threatened with habitat loss, fragmentation, and degradation throughout its range by factors including urbanization, agricultural land use changes, hydrology alterations, and erosion (CNPS 1977; Service 1991; Patterson *et al.* 1994; CH2M Hill 1995; CNDDDB 2005). The only known Mendocino County occurrence is presumably extirpated (CH2M Hill 1995). The largest known occurrence is in Manning Flat on private land in Lake County. This population's habitat is being decimated by extensive gully erosion (CH2M Hill 1995; CNDDDB 2005). A second Lake County population may be threatened by operations associated with the winery property on which it is located (R. Chan, University of California, Berkeley, 1998 *in litt.*). However, in the past the winery owners appeared willing to coordinate with the Service and the Corps to avoid and/or minimize further adverse affects (N. Haley, Corps, 1998 personal communication). Many Burke's goldfields locations on the Santa Rosa Plain have been extirpated due to urbanization and conversion of land to row crops. Burke's goldfields have been nearly extirpated from the Windsor vicinity where it was once abundant (Patterson *et al.* 1994; CH2M Hill 1995).

### Sonoma sunshine

Sonoma sunshine was federally listed as endangered on December 2, 1991 (Service 1991). Critical habitat has not been designated for this species. This species' distribution is confined almost entirely within the Santa Rosa Plain and a comprehensive conservation strategy for the Sonoma County population is included in the Conservation Strategy (Conservation Strategy Team 2005a). Sonoma sunshine is an annual plant in the aster family. This plant is generally described as being less than 11.8 inches (30 centimeters) tall with alternate, linear leaves (CNPS 1977; Hickman 1993). The lower leaves are entire, and the upper leaves have one to three lobes that are 0.4 to 1.2 inches (1 to 3 centimeters) deep (Hickman 1993). It has yellow daisy-like flower heads, and ray flowers with dark red stigmas and disk flowers with white stigmas and white pollen. The flowers of Sonoma sunshine are self-incompatible. The plant's achenes are

0.1 to 0.15 inches (3 to 4 millimeters) long with small rounded or conic proturbences (papillate) and 4 to 6 strongly angled edges (CNPS 1997; Hickman 1993). This species is often confused with common stickseed (*Blennosperma nanum*), but Sonoma sunshine is more robust and has longer and fewer lobes on the leaves (CNPS 1977).

Sonoma sunshine is found in vernal pools and wet grasslands generally below 330 feet (100 meters) (Hickman 1993). As with Burke's goldfields, this species has been found in seasonal wetlands with variable soil types. In the Sonoma and Cotati valleys, it occurs on nearly level to slightly sloping loam, clay loam, and clay soils (Service 1991). The two concentrations of Sonoma sunshine on the Santa Rosa Plain occur on different soil types (Patterson *et al.* 1994). The plants are found on Huichica loam north of Highway 12 and Wright loam and Clear Lake clay south of Highway 12 (Patterson *et al.* 1994; CNDDB 2005). These soil series are briefly described in the previous discussion of Burke's goldfields distribution.

Sonoma sunshine is endemic to Sonoma County. In the Cotati Valley, the species ranges from near the community of Fulton in the north, to Scenic Avenue between Santa Rosa and Cotati in the south. Additionally, the range extends or extended from near Glen Ellen to an area near the junction of State Routes 116 and 121 in the Sonoma Valley. In 2001, two new natural populations were identified north and south of the City of Santa Rosa, increasing the number of previously identified California Natural Diversity Data Base (CNDDB) occurrences from 26 to 28. Of the 28 occurrences, 21 are presumed to be extant with all but one occurring on the Santa Rosa Plain. The remaining occurrence is located in Glen Ellen. In addition, Sonoma sunshine has been introduced to at least one site on Alton Lane during past project mitigation. Seven populations within or near the City of Santa Rosa have been extirpated.

Sonoma sunshine continues to be threatened with habitat loss, fragmentation, and degradation throughout its range by factors including urbanization, agricultural land use changes, and hydrology alterations (Patterson *et al.* 1994; CH2M Hill 1995; CNDDB 2005). Two of five known occurrences have been extirpated in the Sonoma Valley. One was extirpated by habitat destruction in 1986, and the area is now occupied by a vineyard. At the second site, most seasonal wetland habitat was destroyed by grading for home sites in 1980, while the remainder was converted to vineyard or overtaken by weeds (CNDDB 2005). Of the presumed extant Sonoma Valley occurrences, one locality has been largely developed. A small area was retained by California Department of Fish and Game when the development took place, but Sonoma sunshine has not been recorded from this area since the subdivision was developed (Service files). A second Sonoma Valley locale is currently found in a pasture. A portion of this occurrence may have been disked, and the landowners of a second portion want to convert the locale to vineyard (C. Wilcox, 1998, personal communication, Service files). The third Sonoma Valley occurrence is in Sonoma Valley Regional Park, which is not managed for conservation (CNDDB 2005). On the Santa Rosa Plain, one locale has probably been extirpated by completion of a subdivision and another by major land alterations (CNDDB 2005). Of the presumed extant locales, some are characterized as severely degraded habitat, others are

threatened by development, and some have not supported confirmed populations of Sonoma sunshine in recent years (CH2M Hill 1995; CNDDDB 2005).

### Sebastopol meadowfoam

Sebastopol meadowfoam was federally listed as endangered on December 2, 1991 (Service 1991). Critical habitat has not been designated for this species. This species' distribution is confined almost entirely within the Santa Rosa Plain and a comprehensive conservation strategy for the Sonoma County population is included in the Conservation Strategy (Conservation Strategy Team 2005a). Sebastopol meadowfoam is an annual herb with weak, somewhat fleshy, decumbent stems up to 11.8 inches (30 centimeters) tall. This plant is unique amongst the *Limnanthes* genus because its seedlings have entire leaves. Leaves of mature plants are up to 3.9 inches (10 centimeters) long and have 3 to 5 leaflets that are narrow and unlobed with rounded tips. The leaves are borne on long petioles, and petiole length, like stem length, appears to be promoted by submergence. Sebastopol meadowfoam has fragrant, white flowers that are borne in the leaf axils typically between April and May. The flowers are bell- or dish-shaped, with 0.47 to 0.71 inches (12 to 18 millimeters) long petals. The sepals are shorter than the petals. The petals turn outward as the nutlets mature. The nutlets are dark brown, 0.12 to 0.16 inch (3 to 4 millimeters) long, and covered with knobby pinkish tubercles (Patterson *et al.* 1994).

This species grows in a variety of seasonal wetland habitats including Northern Basalt Flow and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995); wet swales and meadows; on the banks of streams; and in artificial habitats such as ditches (Wainwright 1984; Patterson 1990; CNDDDB 2005). The surrounding upland plant communities typically include oak savanna, grassland, and marsh in Sonoma County and riparian woodland in Napa County (California Department of Fish and Game 2002). Sebastopol meadowfoam is found growing in both shallow and deep water, but is most frequently found in pools that are 10 to 20 inches (25 to 51 centimeters) deep (Patterson 1990; Patterson *et al.* 1994). This species is typically most abundant at the margins of vernal pools or swales (Pavlik *et al.* 2000, 2001). Most of the Sebastopol meadowfoam found on the Santa Rosa Plain is on Wright loam or Clear Lake clay soils (Patterson *et al.* 1994; CNDDDB 2005), but is found on other soil types, such as Pajaro clay loam, Cotati fine sandy loam, Haire clay loam (Patterson *et al.* 1994), and Blucher fine sandy loam (Wainwright 1984).

Of the historical records of Sebastopol meadowfoam there are 40 in Sonoma County and a single record (CNDDDB occurrence #39) at the Napa River Ecological Reserve in Napa County. All but two of the Sonoma County occurrences were found in the central and southern portions of the Santa Rosa Plain. Those two were found at Atascadero Creek Marsh, west of Sebastopol (CNDDDB occurrence #20), and in the vicinity of Knights Valley, northeast of Windsor (CNDDDB occurrence #40) (CNDDDB 2005).

Many of the historic Sebastopol meadowfoam occurrences have not been closely monitored and their current status is unclear. The southern cluster of occurrences extends from Stoney Point

Road, approximately 3 miles (4.8 kilometers) west to the Laguna de Santa Rosa, and is bounded by Occidental Road to the north and Cotati to the south. The central cluster extends out approximately 1.5 miles (2.4 kilometers) on either side of Fulton Road from Occidental Road to River Road. There may be only 10 hydrologically separate populations of Sebastopol meadowfoam in the Santa Rosa Plain (Patterson *et al.* 1994). At least one occurrence from the Santa Rosa Plain has been extirpated (CNDDDB occurrence #21) (CNDDDB 2005). Recent survey results suggest that all three occurrences outside of the Santa Rosa Plain have been extirpated (CNDDDB 2005).

Sebastopol meadowfoam is an annual plant. Its seeds germinate after the first significant fall-season rains, and are therefore influenced by annual weather fluctuations. The plants begin development underwater. Growth rates start out slowly but increase as their wetland habitat dries out. Repeated drying and filling of pools in the spring favors development of large plants with many branches and long stems. Flowering typically occurs between March and April. Large plants can produce 20 or more flowers. Flowering may continue as late as mid-June, although in most years the plants set seed and die by early summer (Patterson *et al.* 1994). Each plant can produce up to 100 nutlets (Patterson 1994).

Sebastopol meadowfoam is another species known to exhibit a long-lived seed bank (Jain 1978; Patterson 1994). This was evidenced by a remote historic site where the species remained undetected after multiple years of botanical surveys. During this period, the seasonal wetland habitat was highly degraded by wallowing hogs (*Sus scrofa*). The hogs were removed in the mid-1990's and 12 Sebastopol meadowfoam plants emerged simultaneously in one area the following year. The population expanded rapidly to 60 plants the next year and was larger in subsequent years (Geoff Monk, personal communication with the Service). Long-distance seed dispersal was an improbable explanation for the event which was more appropriately attributed to a long dormant seed bank. This example indicates that lack of Sebastopol meadowfoam during periods of adverse conditions (drought, heavy disturbance, etc.) does not necessarily indicate that the population is extirpated.

Like Burke's goldfields and Sonoma sunshine, Sebastopol meadowfoam has been, and continues to be threatened by habitat loss, habitat degradation, and small population size. Much of this habitat loss is attributed to agricultural conversion, urbanization, and road maintenance. Habitat degradation is often attributed to excessive livestock grazing, alterations in hydrology, and competition from non-native species (in some cases, exacerbated by removal of grazing), off-highway vehicle use, and dumping (Service 1991; Patterson *et al.* 1994; CH2M Hill 1995; CNDDDB 2005).

### Recovery Actions

The Conservation Strategy was developed by a team of representatives (Conservation Strategy Team) from the Service, Corps, U.S. Environmental Protection Agency, California Department of Fish and Game, Sonoma County, local cities, North Coast Regional Water Quality Control

Board, local governmental agencies, the Laguna de Santa Rosa Foundation, the environmental community, and the private landowner community.

The Conservation Strategy is limited to the Santa Rosa Plain which is located in central Sonoma County, bordered on the south and west by the Laguna de Santa Rosa, on the east by the foothills, and on the north by the Russian River.

The purpose of the Conservation Strategy is threefold: (1) to establish a long-term conservation program sufficient to compensate potential adverse effects of future development on the Santa Rosa Plain, and to conserve and contribute to the recovery of the California tiger salamander and a select group of listed plants (Sonoma sunshine, Burke's goldfields, Sebastopol meadowfoam, and many-flowered navarretia [*Navarretia leucocephala* ssp. *Plieantha*]) and the conservation of their sensitive habitat; (2) to accomplish the preceding in a fashion that protects stakeholders' (both public and private) land use interests, and (3) to support issuance of an authorization for incidental take of California tiger salamanders and listed plants that may occur in the course of carrying out a broad range of activities on the Santa Rosa Plain. The Conservation Strategy is posted on the Service's Sacramento office website ([www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html).)

The Conservation Strategy is the biological framework upon which this biological opinion and future regulatory actions within the defined Santa Rosa Plain will be based. The Conservation Strategy will not preserve the species unless implemented by the appropriate agencies. The Conservation Strategy provides the biological basis for a permitting process for projects that are in the potential range of listed species on the Santa Rosa Plain. This is intended to provide consistency, timeliness and certainty for permitted activities. The Conservation Strategy study area is comprised of the potential California tiger salamander range and the listed plant range within the Santa Rosa Plain. The Conservation Strategy establishes interim and long-term mitigation requirements and designates conservation areas where compensation will occur. It describes how preserves will be established and managed. It also includes guidelines for translocation, management plans, adaptive management and funding. Finally, the document describes the implementation planning process.

In the future, the Service will prepare a programmatic biological opinion for California tiger salamander and listed plants based on the Conservation Strategy, and potentially a future implementation plan. The Service will also prepare a recovery plan for the Sonoma County Distinct Population Segment of the California tiger salamander and listed plants as required by the Act. The Conservation Strategy will be the foundation of the recovery plan; however, it does not preclude the obligation of the Service to develop a recovery plan. Other future actions that may occur include the preparation of a Habitat Conservation Plan or Plans.

## Environmental Baseline

### California Tiger Salamander

The approximately 15 mile (24 kilometer)-long proposed combined project corridor for the three Highway 101 projects is adjacent to a variety of land uses that include potential and occupied tiger salamander habitat. Breeding ponds have not been documented within the action area but portions of the Wilfred and Central projects are within 1.3 miles (2 kilometers) of known breeding ponds. Undeveloped open areas throughout the corridor are characterized as potential upland habitat for tiger salamander dispersal, foraging, and refugia.

#### *The Northern Project*

All but the approximately southernmost 1.0 miles (1.6 kilometers) and northernmost 1.5 miles (2.4 kilometers) of the approximately 7.6-mile (12.2 kilometer) Northern Project action area are located within the potential range of the Sonoma County Distinct Population Segment of the California tiger salamander as defined in the Conservation Strategy (Conservation Strategy Team 2005a). Much of the project alignment that lies outside the existing road hardscape is characterized by linear strip of ruderal and landscaped vegetation separating adjacent urban development from Highway 101. Road-side vegetation in the action area is generally characterized by non-native grasses and herbaceous plants, scattered shrubs, and ornamental trees. The Northern Project action area includes the following aquatic habitat: Paulin Creek; Piner Creek, associated tributaries, and an associated wetland; Pruitt Creek; Pool Creek and a tributary; Windsor Creek and a tributary; and various road side drainage ditches. Potential upland habitat is primarily limited to landscaped and maintained, road-side vegetation. This includes annual and perennial grasses, various herbaceous species, scattered shrubs, and ornamental trees. Adjacent land uses vary from fragmenting urban development, intensive agriculture (vineyards), and ruderal fields. Those areas occupied by, or adjacent to, undeveloped fields have the highest potential to support tiger salamanders. The surrounding perennial aquatic habitat is unfavorable to breeding due to the presence of introduced predators such as crayfish (*Pacifastacus leniusculus*) and non-native fishes.

There are three documented California tiger salamander records within 1.3 miles (2 kilometers) of the Northern segment. These include a 1994 larval salamander from the Wright Preserve, approximately 3.2 miles (5.1 kilometers) from southern end of the Northern project; a salamander near Hall Road, approximately 2.9 miles (4.7 kilometers) from the southern end of the Northern project segment in 1989; and a 1996 larval salamander found in the Alton Road Preserve, approximately 1.86 miles (3 kilometers) from the Northern Project action area. Constructed vernal pools within the Alton Preserve are the closest known breeding site to the Northern Project. The Preserve is approximately 1.75 miles (2.82 kilometers) away from the action area and features, including railroad and urban development, exclude this breeding habitat from the Northern Project action area.

*The Wilfred Project*

The Wilfred Project segment is approximately 1 mile (1.6 kilometer) long and is primarily located in a well-developed area of Rohnert Park. The entire Wilfred action area is within the range of the Sonoma County Distinct Population Segment of the California tiger salamander. Much of the project alignment that lies outside the existing road hardscape is characterized by linear strip of ruderal and landscaped vegetation separating adjacent urban development from Highway 101. The Wilfred action area also includes Hinebaugh Creek, Wilfred Channel, and several drainage ditches. Hinebaugh Creek and Wilfred Channel may be seasonal barriers to salamander movement but wetlands that have developed within the drainage ditches in and adjacent to the Wilfred action area may provide California tiger salamander breeding habitat. The northern end of the Wilfred segment includes an area located within a contiguous, approximately 14.35-acre (5.8-hectare) ruderal field that is within 1.3 miles (2 kilometers) of a known breeding pond. Caltrans refers to this approximately 14.35-acre area as the 035 Property. The 035 Property is routinely plowed for vegetation control but includes drainage ditches, swale hydrology, and an approximately 0.61-acre (0.24 hectare) vernal wetland. Drainages, swale hydrology, and the identified wetland will be adversely affected by the project.

An adult California tiger salamander was captured in the 035 Property during a 2003 project-related pitfall trapping effort. A drainage that crossed through the middle of the 035 Property was identified as a potential breeding location but no larval salamander surveys were conducted. Hinebaugh Creek, adjacent to the Rohnert Park Expressway, at the southern end of the Wilfred Project, was also identified as a potential tiger salamander breeding location. Hinebaugh Creek supports perennial inundation, flow, fish, and crayfish. The Haroutunian Reserve is an approximately 20-acre (8 hectare) complex of vernal pools located approximately 632 feet (193 meters) northwest of the 035 Property and approximately 690 feet (210 meters) from the northern extent of the Wilfred Project. This reserve supports breeding pools but may be separated from the Wilfred action area and the 035 Property by railroad tracks and the Bellevue-Wilfred/Wilfred/Todd Channels.

*The Central Project*

All but the approximately southernmost 1.7 miles (2.7 kilometers) of the approximately 6.4-mile (10.3 kilometer) Central Project segment is located within the range of the Sonoma County Distinct Population Segment of the California tiger salamander, as defined in the Conservation Strategy (Conservation Strategy Team 2005a). The population's distribution generally begins north of the Pepper Road/Highway 101 onramp. The northern half of this project segment is located within highly urbanized areas of Rohnert Park and Cotati. This area between the Rohnert Park Expressway and Highway 116 includes fragmented areas of grassland surrounded by development. These areas provide potential upland tiger salamander habitat but appear to be isolated from potential or known breeding ponds. A known breeding pond north of Redwood Drive and south of Helman Lane is accessible from upland habitat within the action area and adjacent to the Highway 116 intersection. An adult California tiger salamander was captured in the Central Project action area during a 2003 project-related pitfall trapping effort. The salamander was captured near the Highway 101/116 interchange in a grassy area adjacent to the

southbound Highway 101 onramp. Another adult California tiger salamander was captured in an urbanized area near commercial development in Rohnert Park in 2002 (SCTA 2004). Adjacent land uses become less urbanized and less fragmented south of Cotati. Grasslands in this area are either fallow or grazed, and support upland, foraging, and dispersal habitat for the tiger salamander. Much of action area south of West Sierra Avenue in Cotati can be described as either potential tiger salamander habitat or appropriate California tiger salamander habitat within 1.3 miles (2 kilometers) of known breeding ponds.

#### Sebastopol Meadowfoam, Sonoma Sunshine, and Burke's Goldfield

The majority of the three Highway 101 projects is located within the range of the Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfields. The combined projects' corridor includes potential seasonal wetland habitat for these three endangered plant species. Listed plants were not found in the three action areas during project-related surveys. However, it is unclear when, how, and where botanical surveys were conducted for the Northern and Central project segments and the surveys did not follow Service-approved protocol. Four years of botanical surveys were completed for the Wilfred segment between 2000 and 2003. The last two years of Wilfred Project botanical surveys were performed according to the Service's *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed Plants on the Santa Rosa Plain*. The nearest recorded observation relative to the three Highway 101 projects for Sebastopol meadowfoam is approximately 1.1 miles (1.77 kilometers) northwest of the Wilfred project. The closest Sonoma sunshine observation is approximately 0.35 miles (0.56 kilometers) northwest of the Wilfred project. The nearest reported location for Burke's goldfield is less than 0.1 miles (0.16 kilometers) east of the Northern project.

Although no listed plants were found in the 0.7 acres (0.28 hectares) of potential habitat within the Wilfred Project action area, the three listed plants may be represented in the existing seed bank. Based on a lack of adequate information, all of the 3.86 acres (1.56 hectares) of wetland habitat identified in the Northern and Central projects' action areas, within the distribution of the three listed plants, are considered potential habitat for the species. Due to the lack of protocol survey results, the presence for these species is likely within potential habitat that is located in the North and Central projects' action areas.

**Effects of the Proposed Action**

The following effects analysis is based on the interim guidelines for the Conservation Strategy (Conservation Strategy Team 2005b). The interim guidelines do not differentiate between temporary and permanent effects.

California Tiger Salamander

The proposed project could have direct effects to California tiger salamanders through direct mortality, injury, or harassment of individual immature animals and adults. According to the October 25, 2004, Biological Assessments for this project, no permanent or seasonal wetlands or ponds appropriate for California tiger salamander breeding would be affected by the proposed action. However, implementation of the proposed action would result in the loss of 50.17 acres (20.29 hectares) of habitat available for the California tiger salamander.

The three Highway 101 projects will likely result in the loss of 3.30 acres (1.33 hectares) of California tiger salamander habitat within 500 feet (152.4 meters) of a salamander observation; 4.60 acres (1.86 hectares) of habitat between 500 and 2200 feet (152.4 to 670.6 meters) of a known California tiger salamander breeding site; 24.18 acres (9.78 hectares) of habitat between 2200 feet and 1.3 miles (670.6 meters and 2.0 kilometers) of a known California tiger salamander breeding site; and 18.09 acres (7.32 hectares) of potential salamander habitat beyond 1.3 miles (2 kilometers) of a known California tiger salamander breeding site. The habitat loss is summarized for each of the three projects in Table 1.

As defined in the Conservation Strategy, effects analysis for the California tiger salamander are primarily based on the location of the action area relative to a known individual salamander observation and breeding pond locations. Those effects are differentiated and classified as follows.

**Table 3.** Effects of proposed action to California tiger salamander habitat by project.

<b>Affected Area</b>	<b>Northern Project</b> (acres/hectares)	<b>Wilfred Project</b> (acres/hectares)	<b>Central Project</b> (acres/hectares)	<b>Total Area</b> (acres/hectares)
Within 500 feet of an individual California tiger salamander	0	0.84/0.34	2.46/0.99	<b>3.30/1.33</b>
Within 500 and 2200 feet of a known California tiger salamander breeding site	0	0	4.60/1.86	<b>4.60/1.86</b>
Within 2200 feet and 1.3 miles of a known California tiger salamander breeding site	0	3.47/1.40	20.71/8.38	<b>24.18/9.78</b>
Within California tiger salamander dispersal habitat	15.72/6.36	0	2.37/0.96	<b>18.09/7.32</b>
<b>Total</b>	<b>15.72/6.36</b>	<b>4.31/1.74</b>	<b>30.14/12.19</b>	<b>50.17/20.29</b>

Mortality, injury, or harassment of the California tiger salamander could occur from being crushed by earth moving equipment and other construction activities within the action area throughout project construction and restoration.

The action area would become unavailable to dispersing tiger salamanders in the vicinity. Individual tiger salamanders inhabiting the action area could be crushed by construction activities that result in the collapse or exposure of upland burrows and other refugia. Individual tiger salamanders disturbed by project activities could attempt overland movements in an effort to find alternative upland habitat. These individuals could be harassed, injured, or killed by pedestrians, vehicles, and urban adapted predators during overland movements within the action area, or during attempts to find more suitable habitats in adjacent areas.

Individuals of this listed species also could fall into trenches, pits, or other excavations, and then be directly killed or unable to escape and be killed due to desiccation, entombment, or starvation. Individuals also may become trapped by plastic mono-filament netting used for erosion control or other purposes where they could be subject to death by predation, starvation, or desiccation (Stuart *et. al.* 2001). Various conservation measures such as minimizing the total area disturbed by project activities, and properly constructing exclusionary fencing may reduce mortality, injury, or harassment.

Construction may facilitate the invasion and establishment of non-native plant and animal species. Disturbance and alteration of habitat adjacent to roads may create favorable conditions for these non-native taxa. Non-native plants and animals may reduce habitat quality for tiger

salamanders and their prey, and reduce the productivity or the local tiger salamander population. Construction related activities are likely to cause disruption of surface movement, disruption or complete loss of reproduction, harassment from increased human activity, and permanent and temporary loss of shelter. Tiger salamanders are primarily nocturnal, therefore the above effects would be further exacerbated should construction be performed at night. Artificial lighting used during night time construction may increase predation of the tiger salamanders during periods of fall, winter, or spring rains, because they lose the protective cover of darkness during critical opportunities for upland movement (Wise and Buchanan 2002). Terrestrial salamanders are known to emerge soon after sunset and artificial lighting may delay emergence, resulting in reduced foraging time (Wise and Buchanan 2002). Tiger salamanders use visual cues to locate their prey and may be aided by artificial lighting. However, for the same reason, lighting may make them more vulnerable to capture by their predators. Many salamanders, such as the tiger salamander, are terrestrial as adults but migrate to ponds to breed and lay eggs. The orientation of some of these terrestrial species to and from these ponds is influenced by the spectral characteristics of light (Wise and Buchanan 2002). Artificial lights that emit unusual spectra may disrupt these migration patterns.

Various other work activities associated with the proposed project also may adversely affect California tiger salamanders. Trash left during or after project activities could attract predators to work sites, which could subsequently harass or prey on the animals. For example, raccoons, crows, and ravens are attracted to trash and also prey opportunistically on amphibians. Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or habitat to a degree where salamanders are adversely affected. Some potential also exists for disturbance of habitat which could result in the spread or establishment on non-native invasive plant species. There is also a possibility that people working on the site, particularly the onsite biologists, could introduce amphibian disease to habitat used by California tiger salamanders.

Increased levels of vehicles and increased vehicle speeds could lead to an increased mortality level for the California tiger salamander in the action area. According to one assessment, amphibian road mortality risk ranges from 34-61 percent for a road with 3,200 vehicles per day to 89-98 percent for a road with 15,000 vehicles per day (Mazerolla, 2004). Although no systematic studies concerning road-crossing mortality of the Sonoma County Distinct Population Segment of the California tiger salamander have been conducted, it is known that significant numbers of California tiger salamanders in other portions of the species' range are killed by vehicular traffic while crossing roads (Hansen and Tremper 1993; S. Sweet, *in litt.*, 1993; J. Medeiros, personal communication with the Service, 1993). For example, during a one-hour period on a road bordering Lake Lagunita on the Stanford University campus, 45 California tiger salamanders were collected, 28 of which had been killed by cars (Twitty 1941). More recently, during one 15-day period in 2001 at a Sonoma County location, 26 road-killed California tiger salamanders were found (D. Cook, Sonoma County Water Agency, personal communication with the Service, 2002). Overall breeding population losses of California tiger salamanders due to road kills have been estimated to be between 25 and 72 percent (Twitty 1941; S. Sweet, *in litt.*,

1993; Launer and Fee 1996). Mortality may be increased by associated roadway curbs and berms as low as 3 to 5 inches (9 to 12 centimeters), which allow California tiger salamanders access to roadways but hinder their exit from them (Launer and Fee 1996; S. Sweet, *in litt.*, 1998). A recent study along a 0.7 miles (1.1 kilometers) high-vehicular-use (21,450 vehicles per day) section of the Trans-Canadian Highway in Alberta, Canada, Clevenger *et al.* (2001) recorded 183 road-killed tiger salamanders (*Ambystoma* species) in 30 days and concluded it was likely that very few of the local population had survived. California tiger salamander mortality on roads occurs throughout each rainy season on the Santa Rosa Plain due to cars running over salamanders that are moving to and from breeding sites.

Successful implementation of various proposed conservation measures may reduce mortality, injury, or harassment of tiger salamanders. Preservation of 43.59 acres (17.62 hectares) of upland and seasonal wetland habitat within appropriate mitigation banks and preserves, or acquired or created habitat would likely benefit the tiger salamander by contributing to the overall recovery of this species. Minimal adverse effects may occur on some of the proposed mitigation banks and preserves as part of their establishment and management, but overall these mitigation banks and preserves are anticipated to have a net beneficial effect for tiger salamanders. Implementation of a management plan for each of the mitigation banks and preserves likely would ensure that the conservation values of the bank or preserve would be maintained to provide optimal conditions for breeding, foraging, refugia, and dispersal of tiger salamanders.

#### Sebastopol Meadowfoam, Sonoma Sunshine and Burke's Goldfield

As defined by the Conservation Strategy, effects analysis for the three listed plants is based on the location of the action area relative to appropriate wetland habitat with the Santa Rosa Plain.

Construction of the three Highway 101 projects will result in the filling of the approximately 4.56 acres (1.85 hectares) of wetland habitat within the described distribution of the Sebastopol meadowfoam, Sonoma sunshine, and Burke's goldfield. This includes 0.7 acres (0.28 hectares) of appropriate seasonal wetland habitat in the Wilfred action area and 3.61 acres (1.46 hectares) of wetland habitat in the Northern and 0.25 acres (0.10 hectares) in the Central project action area. Listed plants were not observed in the Wilfred segment during protocol surveys. However, fill or other disturbance of the 0.7 acres (0.28 hectares) could result in the loss of a dormant seedbank containing one or all three of the listed plants. There are approximately 3.86 acres (1.56 hectares) of wetlands within the described distribution of the three listed plants within the Northern and Central project action area. Given the lack of adequate surveys and the biology of these wetland plants, the proposed projects will result in the loss of 3.86 acres (1.56 hectares) of occupied listed plant habitat.

Preservation of 11.58 acres (4.69 hectares) of existing seasonal wetlands and creation of 0.7 acres (0.28 hectares) of seasonal wetland habitat within the proposed mitigation banks, reserves, or acquired habitat would likely benefit the three listed species by contributing to their overall

recovery. Minimal adverse effects may occur on some of the proposed mitigation banks and preserves as part of their establishment and management, but overall these mitigation banks and preserves are anticipated to have a net beneficial effect for the three listed plants. Implementation of a management plan for each of the mitigation banks and preserves likely would ensure that the conservation values of the bank or preserve would be maintained to provide optimal habitat conditions for these listed plants.

### **Cumulative Effects**

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative effects to the tiger salamander include continuing and future conversion of suitable breeding, foraging, sheltering, and dispersal habitat resulting from urban and agricultural development. Additional urbanization can result in road widening and increased traffic on roads that bisect breeding and aestivation sites, thereby increasing road-kill while reducing in size and further fragmenting remaining habitats.

Tiger salamanders are likely exposed to a variety of pesticides and other chemicals throughout their range. Tiger salamanders could also die from starvation due to the loss of their prey base. Hydrocarbon and other contamination from oil production and road runoff; the application of numerous chemicals for roadside maintenance; urban/suburban landscape maintenance; and rodent and vector control programs may all have negative effects on tiger salamander populations. In addition, tiger salamanders may be harmed through increased road kill due to the construction and use of new roads and increased traffic in the overall region and collection by amphibian enthusiast and others.

The pesticide, methoprene is a commonly used agent for mosquito control, and is used in Sonoma County (Marin/Sonoma Mosquito and Vector Control District, internet website 2002). Methoprene increases the level of juvenile hormone in insect larvae and disrupts their molting process. Lawrenz (1984) found that methoprene (Altosid SR 10) retarded the development of selected crustacea that had the same molting hormones (i.e., juvenile hormone) as insects, and anticipated that the same hormone may control metamorphosis in other arthropods. Because the success of many aquatic vertebrates relies on an abundance of invertebrates in temporary wetlands, any delay in insect growth could reduce the numbers and density of available prey (Lawrenz 1984).

Further habitat fragmentation; additional non-native species introduction; and increased access to aquatic habitat could facilitate or increase the spread of amphibian diseases within the range of the California tiger salamander and the California red-legged frog.

Unauthorized fill of wetlands, urbanization, increases in non-native species, and continued and expanded irrigation of pastures with recycled wastewater discharge, are likely to continue with concomitant adverse effects on Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam. These actions result in additional habitat loss and degradation; increasingly isolated populations (exacerbating the disruption of gene flow patterns); and further reductions in the reproduction, numbers, and distribution of these species which will decrease their ability to respond to stochastic events.

As stated in the Conservation Strategy, urban and rural growth on the Santa Rosa Plain has taken place for over one hundred years, and for the past twenty years, urban growth has rapidly encroached into areas inhabited by the California tiger salamander and the listed plants. The loss of seasonal wetlands caused by development on the Santa Rosa Plain has led to declines in the populations of California tiger salamander and the listed plants. Voters in the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, and the Town of Windsor have established urban growth boundaries for their communities. This is intended to accomplish the goal of city-centered growth, resulting in rural and agricultural land uses being maintained between the urbanized areas. Therefore, it can be reasonably expected that rural land uses will continue into the foreseeable future. There are also areas of publicly owned property and preserves located in the Santa Rosa Plain, which will further protect against development. Some of the areas within these urban growth boundaries, however, include lands inhabited by California tiger salamander and the listed plant species. Agricultural practices have also disturbed seasonal wetlands, which are habitat for the California tiger salamander and listed plant on the Santa Rosa Plain. Some agricultural practices, such as irrigated or grazed pasture, have protected habitat from intensive development.

The Conservation Strategy was designed to plan for future cumulative effects from federal and non-federal actions to the California tiger salamander and listed plant habitat within the Santa Rosa Plain. The Conservation Strategy and the associated interim guidelines are intended to benefit the California tiger salamander and the listed plants by providing a consistent approach for mitigation vital to habitat preservation and the long-term conservation of the species. They are also intended to provide more certainty and efficiency in the project review process. The Conservation Strategy and the interim guidelines provide guidance to focus mitigation efforts on preventing further habitat fragmentation and to establish, to the maximum extent possible, a viable preserve system that will contribute to the long-term conservation and recovery of these listed species.

Implementation of the Conservation Strategy is under the direction of a committee that includes representatives of the County of Sonoma; the Cities of Santa Rosa, Cotati, and Rohnert Park; the Town of Windsor; the Service; and the California Department of Fish and Game; and other representatives the local agricultural, development, and environmental interests. The implementation plan will provide the guidance needed to apply the Conservation Strategy to a diverse range of public and private projects. The implementation planning process should be

completed within approximately two years, after which the local agencies and participating State and Federal agencies will take action regarding implementation of the Conservation Strategy.

### **Conclusion**

After reviewing the current status of the California tiger salamander and the three listed plants, the environmental baseline for the action areas, and the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the three Highway 101 projects are not likely to jeopardize the continued existence of these four listed species. We based these determinations on the following: (1) the effects analysis and compensation abide by the guidelines of the Conservation Strategy, (2) the action area primarily provides upland habitat for the California tiger salamander, (3) no California tiger salamander breeding ponds will be lost within the action area, and/or (4) numerous conservation measures would be implemented to minimize the effect of take on individual California tiger salamanders and the three listed plants. The loss of upland foraging, dispersal, and seasonal wetland habitat within the action area will be minimized by the preservation and management of 45.59 acres (17.62 hectares) of tiger salamander habitat and 12.28 acres (4.97 hectares) of habitat for the three listed plants. Critical habitat has not been proposed or designated for the three listed plants; therefore none will be adversely modified. Critical habitat has not been designated for the California tiger salamander; therefore none will be adversely modified.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation, pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by Caltrans/SCTA so they become binding conditions of project authorization for the exemption under 7(o)(2) to apply. Caltrans/SCTA has a continuing duty to regulate the activity that is covered by this incidental take statement. If Caltrans/SCTA (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms, and/or (2) fails to retain

oversight to ensure compliance with these terms and conditions, the protective coverage of 7(o)(2) may lapse.

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for removal or reduction to possession of endangered and threatened plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, damage, or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

### **Amount or Extent of Take**

#### California Tiger Salamander

The Service anticipates that incidental take of the California tiger salamander will be difficult to detect or quantify for the following reasons: the activity patterns of tiger salamanders makes the finding of a dead specimen unlikely, losses may be masked by annual fluctuations in numbers, and the species occurs in habitat that makes it difficult to detect. Due to the difficulty in quantifying the number of the California tiger salamanders that will be taken as a result of the proposed action, the Service is quantifying take incidental to the three Highway 101 projects as the number of acres of habitat that will be affected as a result of the action. Therefore, the Service estimates that the proposed action will result in the take of all California tiger salamanders inhabiting or utilizing the 50.17 acres (20.29 hectares) of appropriate habitat identified in the action area. Anticipated take is expected to be in the form of harm, harassment, capture, injury, and mortality from habitat loss and modification, construction related disturbance, increased predation, reduced fitness, and by ongoing operation and use of the improved Highway 101 roadway.

### **Effect of the Take**

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the California tiger salamander.

### **Reasonable and Prudent Measures**

The following reasonable and prudent measures are necessary and appropriate to minimize the effect of the three Highway 101 projects on the California tiger salamander:

1. Caltrans/SCTA will implement the three Highway 101 projects as described in the October 25, 2004, Biological Assessment and this biological opinion.
2. Reduce effects to the California tiger salamander.

3. Ensure compliance with this biological opinion by Caltrans/SCTA.

### **Term and Condition**

To be exempt from the prohibitions of section 9 of the Act, Caltrans/SCTA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The following Terms and Conditions implement Reasonable and Prudent Measure one (1):
  - a. Caltrans/SCTA shall minimize the potential for harm, harassment, or killing of federally listed species resulting from project related activities by implementation of the conservation measures as described in the Biological Assessment, and appearing in the Project Description of this biological opinion.
  - b. Caltrans/SCTA shall make the terms and conditions in this biological opinion a required term in all contracts for the three Highway 101 projects that are issued by them to all contractors.
2. The following Terms and Conditions implement Reasonable and Prudent Measure two (2):
  - a. The Resident Engineer or their designee shall be responsible for implementing the conservation measures and Terms and Conditions of this biological opinion and shall be the point of contact for the project. The Resident Engineer shall maintain a copy of this biological opinion onsite whenever construction is taking place. Their name and telephone number shall be provided to the Service at least thirty (30) calendar days prior to groundbreaking at the project. Prior to ground breaking, the Resident Engineer must submit a letter to the Service verifying that they possess a copy of this biological opinion and have read the Terms and Conditions.
  - b. A qualified biologist(s) shall be onsite during all activities that may result in the take of the California tiger salamander. The biologist shall have oversight over implementation of all the Terms and Conditions in this biological opinion, and shall have the authority to stop project activities, through communication with the Resident Engineer, if any of the requirements associated with these Terms and Conditions are not being fulfilled. The qualifications of the biologist(s) must be presented to the Service for review and written approval prior to ground-breaking at the project site. Prior to approval, the biologist(s) must submit a letter to the Service verifying that they possess a copy of this biological opinion and understand its Terms and Conditions. The biologist(s) will keep a copy of this biological opinion in their possession when onsite. The biologist(s) shall be given the authority to stop any work

that may result in take of this listed animal species. If the biologist(s) exercises this authority, the Service and the California Department of Fish and Game shall be notified by telephone and electronic mail within one (1) working day. The Service contact is Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Division at the Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

- c. Permanent and temporary disturbances and other types of project-related disturbance to habitats of the California tiger salamander shall be minimized to the maximum extent practicable by Caltrans/SCTA. To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads and other designated areas. These areas also should be included in pre-construction surveys and, to the maximum extent possible, should be established in locations disturbed by previous activities to prevent further adverse effects.
- d. Prior to any ground disturbance, pre-construction surveys shall be conducted by a Service-approved biologist for the California tiger salamander. These surveys shall consist of walking surveys of the project limits and adjacent areas accessible to the public to determine presence of the species.
- e. The onsite biological monitor will check for animals under any equipment such as vehicles and stored pipes before the start of work each morning. The biological monitor will check all excavated steep-walled holes or trenches greater than one foot (0.3 meters) deep for California tiger salamander. California tiger salamanders will be removed by the biological monitor and translocated under the direction and authorization of the Service and as described in the Conservation Strategy.
- f. Only Service-approved biologist(s) who are familiar with the biology and ecology of the California tiger salamander shall capture or handle this listed species.
- g. Biologists shall take precautions to prevent introduction of amphibian diseases to the action area by disinfecting equipment and clothing as directed in the October 2003 California tiger salamander survey protocol titled, *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander*. This protocol is available at the Service's Sacramento office website (<http://www.fws.gov/sacramento/es/protocol.htm>). Disinfecting equipment and clothing is especially important when biologists are coming to the action area to handle salamanders after working in other aquatic habitats.
- h. Project-related vehicles shall observe a 15-miles/hour (24 kilometers/hour) speed limit within project areas, except on County roads, and State and Federal highways; this is particularly important on rainy nights when California tiger salamanders are most active. To the maximum extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas shall be prohibited

- i. To prevent inadvertent entrapment of California tiger salamanders during construction, all excavated, steep-walled holes or trenches more than 2 feet (0.61 meters) deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped listed animal is discovered, the on-site biologist should immediately place escape ramps or other appropriate structures to allow the animal to escape, or the Service and/or California Department of Fish and Game shall be contacted by telephone for guidance. The Service shall be notified of the incident by telephone and electronic mail within one working day.
- j. All equipment will be maintained such that there will be no leaks of fluids such as gasoline, oils, or solvents.
- k. The construction area shall be delineated with highly visible temporary fencing at least 4 feet (1.2 meters) in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment onto any sensitive areas during project work activities. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site. No project activities will occur outside the delineated project construction area.
- l. To eliminate an attraction to predators of the California tiger salamander, all food-related trash items such as wrappers, cans, bottles, and food scraps must be disposed of in closed containers and removed at least once every day from the entire project site.
- m. To prevent harassment, injury or mortality of California tiger salamander or destruction of their refugia or burrows by dogs or cats, no canine or feline pets shall be permitted in the action area.
- n. Plastic mono-filament netting (erosion control matting), or similar material, shall not be used at the three Highway 101 project sites because California tiger salamanders may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.
- o. An employee education program covering the California tiger salamander must be conducted before groundbreaking for each of the three Highway 101 projects. The program should consist of a presentation by the on-site biologist to explain listed species concerns to all contractors, their employees, and agency personnel involved in the project. The program should include a description of the California tiger salamander and its habitat needs; an explanation of the status of this species and its protection under the Endangered Species Act; and a description of the measures being

taken to reduce effects to this species during project construction and implementation. An outline of the training program shall be submitted to the Endangered Species Program at the Sacramento Fish and Wildlife Office within twenty (20) working days prior to the start of construction. Documentation of the training, including individual signed affidavits, will be kept on file and available on request.

- p. Following the Conservation Strategy guidelines, sites used for compensation must meet or exceed the following minimum performance standards/suitability requirements (Conservation Strategy Team 2005b):
- (1) Be within the boundary of one of the Conservation Areas defined in the Conservation Strategy.
  - (2) The conservation site must meet one of the following standards:
    - (a) Contain known, occupied California tiger salamander breeding, aestivation, or dispersal habitat and/or known population or populations of federally listed plants; or represent potential California tiger salamander or plant habitat. With respect to potential California tiger salamander or plant habitat the site must exhibit, in the judgment of the Service or the California Department of Fish and Game, reasonable potential for habitat restoration or enhancement; or
    - (b) Be approved by the Service and the California Department of Fish and Game and function as 1) a buffer separating an existing or likely future preserve site from nearby incompatible land uses (e.g., areas without California tiger salamander habitat); 2) a corridor or link from one preserve site to another or one conservation area to another; or 3) an open space that provides other specific and recognizable conservation value for listed species.
  - (3) The conservation site must be free of excessive land surface features (e.g., roads parking lots, other hardened surfaces, buildings or other structures or extensive hardscape) that cause a significant portion of the site to be unsuitable as California tiger salamander or listed plant habitat. Generally, no more than 15 percent of the land surface of any potential preserve site may include or be covered by such features unless it is to be restored as part of the preservation action.
  - (4) The conservation site shall not be isolated from other nearby California tiger salamander habitats (preserve or non-preserve) by incompatible land uses (e.g., hardscape) or other significant barriers to California tiger salamander movement and dispersal.

- (5) The conservation site shall not be inhabited by fish and bullfrogs or other non-native predatory species, unless, in the judgment of the Service and the California Department of Fish and Game, such species can be effectively removed or eradicated.
- (6) The conservation site shall not be within the Laguna de Santa Rosa 100-year floodplain.
- (7) The conservation site shall not exhibit history or evidence of the presence (storage or use) of hazardous materials on the surface of the site unless proof of removal or remediation can be provided.
- (8) The applicant/developer shall provide fee title or a conservation easement as required by the Service and the California Department of Fish and Game. The property shall be preserved for the benefit of the affected species, and any retained activities (i.e., agricultural) must be compatible with this purpose.
- (9) The applicant/developer shall provide a wetland creation plan, if wetlands are filled, as or if California tiger salamander pools/ponds are to be created.
- (10) The applicant/developer shall provide a Conservation and Monitoring Management Plan that contains, at a minimum, the following components:
  - (a) The conservation lands must be managed and monitored, and any necessary enhancements, as required by the Service and the California Department of Fish and Game, must be enforceable.
  - (b) The Conservation and Monitoring Plan shall describe specific management actions necessary to manage, enhance, and preserve the resources protected and created on the site and monitoring that will be conducted to determine the success of created wetland and stature of the protected resources and effectiveness of specified management actions.
  - (c) Endowment: funding in an amount determined by the Service and the California Department of Fish and Game shall be provided to assure long-term management and monitoring.
- q. If Caltrans/SCTA purchases habitat credits from a Service and California Department of Fish and Game approved conservation bank, payments shall be made prior to groundbreaking. Caltrans/SCTA will provide the Service with the appropriate documents indicating that credits have been purchased, specifically including the amount of credits purchased based on the actual area affected by the proposed action.

- r. If fee title or conservation easements are pursued to conserve occupied or suitable habitat for the California tiger salamander, the fee title or conservation easements shall be acquired in a location that will assist in recovery. Caltrans/SCTA shall obtain the written approval of the Service that the parcel(s) are suitable for the California tiger salamander prior to acquiring interest in those lands. The fee title or conservation easements for the conserved habitat shall be obtained by Caltrans/SCTA prior to the initial ground disturbance.
- s. If conservation easements are used by Caltrans/SCTA, they shall include, but not be limited to, provisions and responsibilities of the project proponents and the land trust organization approved by the Service for the protection of all habitats set aside including any future transfers of the easements or fee interest that may be anticipated. The easements shall specify the purposes for which it is established (i.e., measures to minimize effects to the California tiger salamander and/or the three listed plants, associated with the projects). Caltrans/SCTA shall provide the Service with a true copy of the recorded conservation easements within thirty (30) calendar days of its recordation. The conservation easements shall be held by a third party approved by the Service. The conservation easement shall include a list of prohibited activities that are inconsistent with the maintenance of the preserve for the listed species including, but not limited to:
  - (1) leveling, grading, landscaping, cultivation, or any other alterations of existing topography for any purposes, including the exploration for, or development of, mineral resources;
  - (2) placement of any new structures on the preserve, including buildings and billboards;
  - (3) discharge, dumping, burning, or storing of rubbish, garbage, grass clippings, dredge material, household chemicals, or any other wastes or fill materials within the preserve;
  - (4) building of any roads or trails within the preserve areas;
  - (5) killing, removal, alteration, or replacement of any existing native vegetation except in Service-approved prescribed burning situations, or as otherwise authorized in writing by the Service;
  - (6) activities that may alter the hydrology of the preserve and the associated watersheds, including but not limited to: excessive pumping of groundwater, manipulation or blockage of natural drainages, inappropriate water application or placement of storm water drains, etc. unless authorized in writing by the Service;

- (7) incompatible fire protection activities;
  - (8) use of pesticides, herbicides, or rodenticides on the preserve or within the watershed that can contaminate the preserve except as authorized in writing by the Service; and
  - (9) introduction of any exotic species or species not native to the area, including aquatic species, except as approved by the Service.
- t. In the event Caltrans/SCTA seeks to obtain a conservation easement in lieu of fee title acquisitions for the purposes of satisfying the requirements of the terms and conditions of this biological opinion, Caltrans/SCTA shall provide the language of the proposed conservation easements to the Service for prior review and approval. The conservation easements shall include language establishing a right of entry by the Service to determine compliance with the terms and conditions of this biological opinion and the terms of the conservation easements, as well as identifying the Service as a third party beneficiary with the standing to take whatever legal action is necessary to enforce the terms of this conservation easement. Should Caltrans/SCTA make fee title acquisition of lands to satisfy the terms and conditions of this biological opinion, Caltrans/SCTA shall encumber such lands with restrictive covenants that provide the same rights to the Service as would be established under the conservation easement described above. Such restrictive covenants shall be provided to the Service for prior review and approval before they are recorded against the conservation lands.
- u. Funds donated to the Santa Rosa Plan Conservatin Fund, administered by the California Wildlife Foundation to compensate for the effects of the action on California tiger salamander dispersal habitat will be based on the most recent guidelines outlined by the California Department of Fish and Game and the Service. These funds will include current per acre costs plus a percentage administration fee. The current guidelines are described in Enclosure 2 of the May 16, 2006 Interim Strategy.
- v. Prior to the initial ground breaking at the proposed three Highway 101 projects, Caltrans/SCTA shall endow a Service-approved fund for monitoring and perpetual management and maintenance of the conserved habitat that has been protected by Caltrans/SCTA under fee title and/or conservation easements. The principal in the endowment must generate sufficient revenue to fully cover the costs of ongoing operations and management actions as described in the Service-approved management plan and this biological opinion, without the need to make use of the principal to adequately fund such expenditures. Specific actions funded by the endowment shall be addressed in the Service-approved management plan. Caltrans/SCTA shall utilize an appropriate third party who has been approved by the

Service to determine what amount of money is necessary for an endowment fund to adequately finance the monitoring and perpetual management and maintenance of the preserve for the California tiger salamander. Caltrans/SCTA shall empower the Service to access and expend such funds to implement Service-approved remedial measures in the event the responsible preserve managers fail to adequately implement the Service-approved management plan. The final determination of success or failure of the management plan shall be made solely by the Service. Prior to the initial ground breaking of any of the three Highway 101 projects, Caltrans/SCTA shall provide the Service with documentation that: (1) funds for the perpetual management and maintenance of the conserved habitat has been transferred to the appropriate third party approved by the Service; (2) the third party has accepted the funds and considers them adequate; and (3) that these funds have been deposited in an account (i.e., endowment) that will provide adequate financing for the monitoring and perpetual management and maintenance of the conserved habitat.

3. The following Terms and Conditions implement Reasonable and Prudent Measure three (3):
  - a. If requested, before, during, or upon completion of ground breaking and construction activities, Caltrans/SCTA shall allow access by Service and/or California Department of Fish and Game personnel to any of the three Highway 101 project sites to inspect project effects to the California tiger salamander and its habitat.
  - b. Initiation of the construction of the three projects is anticipated within 10 years from the date of issuance of this biological opinion. Because of the potential for significant changes to the California tiger salamander and the three listed plants, and their habitats, the Conservation Strategy, and the species baseline before the completion of construction for any of the three projects, FHWA, Caltrans, and SCTA shall reinstitute formal consultation if construction for any of the three projects has not been completed within 12 calendar years from the date of issuance of this biological opinion.
  - c. Caltrans/SCTA shall provide the Service with adequate annual written reports that describe the progress of implementation of all of the Terms and Conditions of this biological opinion. The first report is due December 31, the first year of groundbreaking, and annually thereafter on December 31 until all of the terms and conditions are completed, as stated in writing by the Service. The reports shall be addressed to the Chief of the Endangered Species Division, Sacramento Fish and Wildlife Office.
  - d. Caltrans/SCTA shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within 60 calendar days of the completion of construction. This report shall detail (i) dates that construction

occurred; (ii) pertinent information concerning the success of the projects in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the California tiger salamander, if any; (v) occurrences of incidental take of this species; and (vi) other pertinent information. The reports shall be addressed to the Chief of the Endangered Species Division, Sacramento Fish and Wildlife Office.

- e. Caltrans shall report to the Service any information about take or suspected take of listed wildlife species not authorized in this biological opinion. Caltrans must notify the Service via electronic mail and telephone within 24 hours of receiving such information. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal shall be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Division, Sacramento Fish and Wildlife Office at (916) 414-6600, and the Service's Law Enforcement Division at (916) 414-6660.

### **Reporting Requirements**

Injured California tiger salamanders must be cared for by a licensed veterinarian or other qualified person, such as the on-site biologist; dead individuals should be preserved according to standard museum techniques and held in a secure location. The Service and the California Department of Fish and Game must be notified within one (1) working day of the discovery of death or injury to a California tiger salamander that occurs due to project related activities or is observed at the project site. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600, and Scott Heard, Resident Agent-in-Charge of the Service's Law Enforcement Division at 916/414-6660. The California Department of Fish and Game contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, California 95814, (916) 654-4262.

Caltrans/SCTA shall submit post-construction compliance reports prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within sixty (60) calendar days of the date of the completion of construction activity on each of the three projects. These reports shall adequately describe (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the California tiger salamander and the listed plants, if any; (v) occurrences of incidental take of any of these

listed species, if any; (vi) documentation of employee environmental education; and (vii) other pertinent information.

### CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. We make the following conservation recommendations:

1. Encourage or require the use of appropriate California native species in re-vegetation and habitat enhancement efforts associated with projects authorized by FHWA.
2. Caltrans/SCTA should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California tiger salamander, Burke's goldfields, Sonoma sunshine, Sebastopol meadowfoam, and other appropriate species. Such banking systems also could possibly be utilized for other required mitigation (i.e., seasonal wetlands, etc.) where appropriate.
3. Facilitate educational programs geared toward the importance and conservation of seasonal wetlands.
4. Encourage seed banking in Center for Plant Conservation certified botanic gardens (provided the seed collection does not adversely affect the source populations).
5. Assist the Service in implementing the Conservation Strategy and recovery actions being developed for the California tiger salamander, Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam.
6. Sightings of any listed or sensitive species should be reported to the CNDDDB of the California Department of Fish and Game. A copy of the reporting form and a topographic map clearly marked with the location where the individuals were observed should also be provided to the Service.
7. Caltrans/SCTA should incorporate culverts, tunnels, or bridges on highways and other roadways that allow safe passage by California tiger salamander, other listed animals, and wildlife. Caltrans should include photographs, plans, and other information in their biological assessments if they incorporate "wildlife friendly" crossings into their projects.

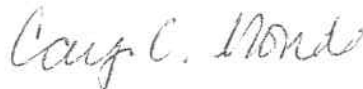
In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

### REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action on the three proposed Caltrans/SCTA Highway 101 Lane Widening and Improvement Projects in Sonoma County, California County, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Ryan Olah or Chris Nagano at the letterhead address or at (916) 414-6600, if you have any questions regarding this biological opinion on the Caltrans/SCTA Highway 101 Lane Widening and Improvement Projects.

Sincerely,



Cay C. Goude  
Acting Field Supervisor

cc:

Carl Wilcox, California Department of Fish and Game, Yountville, California  
Liam Davis, California Department of Fish and Game, Yountville, California  
Tracy Love, California Department of Fish and Game, Yountville, California  
Scott Wilson, California Department of Fish and Game, Yountville, California  
Andrew Jenson, Regional Water Quality Control Board, Santa Rosa, California  
Guy Preston, Sonoma County Transportation Authority, Santa Rosa, California  
Christopher States, California Department of Transportation, Oakland, California

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- \_\_\_\_\_ 31 August 1998 letter to Dwight Harvey, U.S. Fish and Wildlife Service. With enclosed report, "Vineyard development posing an imminent threat to *Ambystoma californiense* in Santa Barbara County, California."

## **Appendix H Agency Consultation and Coordination**

During the preparation of this document, the following agencies were consulted:

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service

California Department of Fish and Game

Sonoma County Transportation Authority

City of Rohnert Park Planning Department

## **Appendix I List of Technical Studies**

Project Study Report: In Sonoma County on Route 101 From Route 116(W) to Santa Rosa Overcrossing, 1991.

Natural Environment Study Report, including the Biological Assessment for the California Tiger Salamander and the Habitat Quality Evaluation of Vernal Pool Ecosystem Sites in the Santa Rosa Plain, from Rohnert Park Expressway to Wilfred Avenue Interchange, March 2004.

Water Quality Comments for New Project Alternative, March 15, 2000.

Initial Site Assessment for New Alternative, March 14, 2000.

Negative Archaeological Survey Report, November 1999.

Relocation Impact Report, Right of Way, July 17, 2001.

Air Quality Impact Report, Route 101 From Rohnert Park Expressway o/C to Santa Rosa Avenue O/C in Sonoma County, August 15, 2001.

Noise Impact Report For The Proposed Widening Project on Route 101 in Sonoma County from Rohnert Park Expressway O/C to Santa Rosa Avenue O/C, August 15, 2001.

Traffic Operations Analysis Report-Sonoma 101 Widening Project, California Department of Transportation, June 2001.

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Traffic Operations Analysis Report, California Department of Transportation, June 2003.

Geology and Soils for Wilfred Avenue Interchange Project, May 15, 2001.

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## **Appendix J Other Documents Referenced for this IS/EA**

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Sonoma/Marin Multi-Modal Transportation & Land Use Study, Final Report, Prepared for the Sonoma County Transportation Authority and The Main Countywide Planning Agency, Calthorpe Associates, June 6, 1997.